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Hope for the Dammed: The U.S. Army Corps of Engineers and the Greening of the Mississippi

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HOPE FOR THE DAMMED

The U.S. Army Corps of Engineers and the
Greening of the Mississippi



Todd Shallat, Ph.D.

Hope for the Dammed

By Todd Shallat, Ph.D.

Hope for the Dammed

On the Cover:

Accommodating approximately 70 million tons of commercial traffic annually, the Melvin Price Locks and Dam 26 is the largest of its kind on the Mississippi River.

Melvin Price Locks and Dam replaced Lock and Dam 26, which was demolished in 1990. Almost from the beginning, Lock and Dam 26 was plagued with structural deficiencies. Scour holes developed below the dam. This was of particular concern because some of the holes were deeper than the wooden pilings supporting the dam. The scouring of the riverbed led to the disintegration of the concrete and a loss of foundation material, which eventually resulted in excessive deflections and settlement of the lock walls and dam piers.

The construction of the Melvin Price Locks and Dam constituted the first replacement of an original installation of the 9-Foot Channel Project. The new structure is located two miles downstream of the razed Lock and Dam 26, but the significance of the new installation is not limited to its colossal size. Throughout its design and construction, the Corps engaged in an extensive program of computer-assisted design, testing and evaluation to create a structure that represents the state of the art in river navigation control works.

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Foreword

You cannot read this remarkable document without gaining troubling insights into many of the challenges we as a nation face at the intersection of physical forces of nature with the human constructs of technology, politics and finance. Todd Shallat has brought these issues to us, using the lens of history to tell a series of stories that together illuminate our understanding of how the U.S. Army Corps of Engineers has been a blessing and a curse to the millions of people, creatures, plants, industries and communities whose existence is shaped by the Mississippi River.

The central dilemma posed by Shallat in this piece is that large-scale, centralized technological systems, even when based on good science and sound engineering, could have bad consequences. Using the example of the Corps and the Mississippi, Shallat demonstrates that what we as a nation have built to protect us from the forces of nature may, in fact, lead to our increased vulnerability. It is the dilemma of unintended consequences. Following Hurricane Betsy, Shallat writes of “the tragedy of safety innovations that promote unsafe behavior, of unknowable hazards and unintended effects.”

This is a highly personal document. Shallat is a participant, not just an observer. He weaves his personal experience and insights along with other participants, citing many interviews he has had over the years. He supports these personal observations with a combination of historical scholarship and archival research. But this is an essay in the true meaning of the word. It is not an academically focused history. Rather, it is written for the concerned citizen, be they environmentalist, engineer, or politician, to be able to better understand the physical issues confronting this important part of our world. The role of public works infrastructure as part of the problem and the solution is a central issue.

Some will most certainly find this essay troubling. Shallat does not pull punches, offering facts to challenge those on the right and the left politically. Even more so, he challenges many of the assumptions many of us make about the environment, the role of government and the ability of engineers to use science and technology to the benefit of humanity without costs that could be catastrophic.

Howard Rosen, Ph.D.

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" . . . And nature must obey necessity."

Shakespeare, *Julius Caesar*, Act IV, Sc. 3

Preface

Always, like the Great Mississippi, the U.S. Army Corps of Engineers has been a conduit of hope and fear and scientific conjecture, of faith in American progress and terror of what progress has wrought. Always the Engineers have shouldered much of the credit and blame for massively spectacular projects. Always, since the 1820s, when the agency emerged as a builder and broker on the Mississippi, the Corps has enlisted science in the service of waterway engineering that defenders call monumental and detractors call grandiose.

My involvement began in the aftermath of Earth Day when the Corps, said a famous critic, was the environment's "public enemy number one." The critic, quoted in the magazine *Playboy* in 1969, was Supreme Court Justice William O. Douglas. Ten years later and eight blocks from Douglas's courthouse, on Massachusetts Avenue in Washington, D.C., I labored on a dissertation about engineering traditions in the Corps office of history in Washington, D.C. The dissertation led to a book that Corps insiders applauded and elsewhere denounced. One intelligent reader was General Robert Flowers of the Corps' Lower Mississippi Valley Division (since expanded northward to include the upper valley). Flowers admired the book but claimed I had understated the depths of the Corps's commitment to environmental protection. Would I visit the Corps in Vicksburg and tour the river up close? Corps historian Michael Robinson, who worked closely with Flowers, arranged for a sabbatical grant. Tragically, in 1998, Robinson died of heart failure. Two years into the project, with four of five chapters complete, the research was suspended. Chapters and excerpts were published in a dozen places—in online exhibits on the Vicksburg division's web page, in *Technology and Culture*, *Illinois Heritage*, *The Military Engineer*, and Craig Colten's edited volume of New Orleans essays published in 2001.

Hope for the Dammed retrieves three regional parts of the 1990s research. Moving north against the current, and metaphorically against the flow of my own assumptions about the Corps on the Mississippi, the study extends from the Head of Passes to the locks of St. Louis. It sojourns in places besieged and bitterly contested—in St. Bernard Parish below New Orleans where swamplers blame the rising ocean on shipping; in Louisiana's Atchafalaya and Yazoo's cotton plantations; in the dredged aquatic freightway of the Corps' slackwater dams.

Much has happened on the river since Robinson's passing, and much of what has happened has validated the study's original purpose and flow. Six years before Katrina it was bluntly stated in these pages that New Orleans would be devastated. Twelve years before the BP disaster it was clear that the Corps, our hired scapegoat, would be targeted by fear of rising oceans and costly dependence on oil. As for the premise that launched this study—the assumption that the Engineers, like sinners reborn, went green in wake of Earth Day—the findings are inconclusive. No single mission or politician has ever governed the Corps on the Mississippi where each of the six construction districts takes on a character of its own. The New Orleans district

rightly keeps its focus on marsh restoration and flooding. The Corps in St. Paul takes justifiable pride in recreation and tourism parks. Even on the same floor of a single building it is possible to find a confusion of conflicting viewpoints. At district headquarters in St. Louis, where I visited the blue-cubicked applied engineering center, a hydrologist expounded on the vital importance of lock-and-dam expansion. Down the linoleum hall, in the office of environmental compliance, a Corps biologist with equal passion defended the pallid sturgeons endangered by dams.

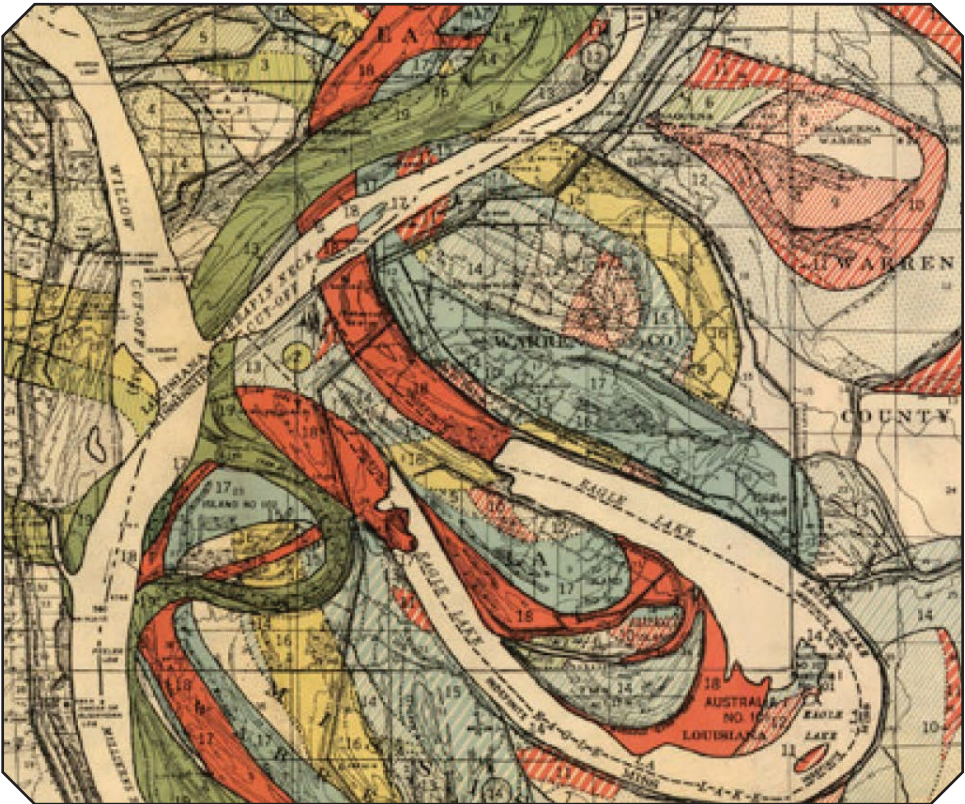
The Corps, I was reminded, was Sibyl with a thousand faces. Its story had shifted in my retelling from engineering achievement to the study of politics and cultural values that conditioned engineering to cope.

Todd Shallat, Ph.D.
Boise State University
September 2013

Prologue

Losing Louisiana

Geologists call it subsidence. Swampers say the salt marsh trembles and floats where the toe of Louisiana slips toward Havana, bleeding soil from 31 states. Layers of compacted mud weigh down the butter-soft lowlands. Ponds become estuaries. Barrier islands erode, exposing beachfront. Shore migrates and so does the mile-wide river that carved in its time five paths to the ocean. Curling and coiling like a snake in a sand box, the Mississippi giveth and taketh away: it fans alluvial silt then leaps to a new location . . . building, destroying. No dam or system of levees can hold a mudscape in motion. Yet hold we must for the sake of 2.1 million Louisianans on 3.3 million acres of marshland, for the nation's largest fin and shell fishery, for nine ports, 3,000 miles of shipping channels and 16,000 miles of pipelines, for 70 percent of the winged commuters on the Great Mississippi Flyway, for 15 percent of America's oil and 20 percent of its natural gas.¹



The Mississippi braids through Arkansas-Louisiana, 1844. (U.S. Mississippi River Commission)

Holding Louisiana predates the Louisiana Purchase as a scientific focus of levee and waterway engineering. The U.S. Army Corps of Engineers, founded in 1802, sent the Frenchman Simon Bernard to the passes south of New Orleans soon after the War of 1812. The Corps has since defended the Lower Mississippi from foreign invasion and Confederate rebellion, from snags that impaled the steamboats, from hurricanes and floods. As Louisiana recedes, however, the agency confronts a conundrum beyond the dam-it, ditch-it tradition: how to let the world's third-ranking river approximate the rhythms of nature—to meander and spread its mud blanket across a collapsing delta, to nourish without disrupting navigation or risking a serious flood. Corps levees block the silt needed to replenish the lowlands. Corps dredging loosens the land by killing freshwater plants. Floodgates and reservoirs further aggravate marsh subsidence, yet to abandon these kinds of projects would be to court economic disaster. To build as before would be to permit a catastrophe worse.

Like vengeance rained down on a state known to resist swamp regulation in a nation that plows and paves about 800,000 wet acres each year, the tragedy of the marsh has become, as the Secretary of Interior put it, “the single most important environmental issue of our times.”² And it's not just a coastal problem. Upriver where the sweetgums grow and cattails spread in the shallows, the flood-protected long for the grassy streams once braided through sodden hardwoods: in Minnesota where urban sewage and PCBs have poisoned backwater marshland; in Missouri where navigation dikes have quickened sedimentation; in Kentucky and Tennessee where the clearing of flood-prone creeks has aggravated forest erosion; in Arkansas where farming behind federal levees has decimated flood-swept woodlands; in Louisiana where the river below Baton Rouge is a sewer for chemical toxins; in Mississippi where the draining of the Yazoo delta has replaced a watery land with furrows of cotton and soybeans—a bad habitat for songbirds and heron, a threat to the nesting and resting of migratory geese and ducks.³

What builders might possibly do to restore America's mainstream is a technological quandary clouded by foreboding and doubt. So jaded are expectations. So grim is the national fear of what engineers might yet do to nature that it is hard to imagine the serious battle against engineering's most harmful effects. Yet the Corps swings with the nation. Pliant and decentralized, the waterway organization answers mostly to Congress; also to the President, the Secretary of the Army, the courts, regional commissions, public opinion, the laws of physics and finance, and the agency's own historical sense of organizational purpose. Critics say that inner direction is a bias toward massive construction. Defenders say the Corps has learned to rethink the meaning of river improvement as the green agenda diverts the waterway fund. Oystermen want freshwater diversions. Duck hunters want reedy lakes and bottomland hardwoods. The Mississippi Wildlife Foundation wants to preserve a riverine corridor for migratory fruit bats. The president of the Baton Rouge Audubon Society wants to reclaim green strips of healthy woodland by reflooding forests and farms.⁴

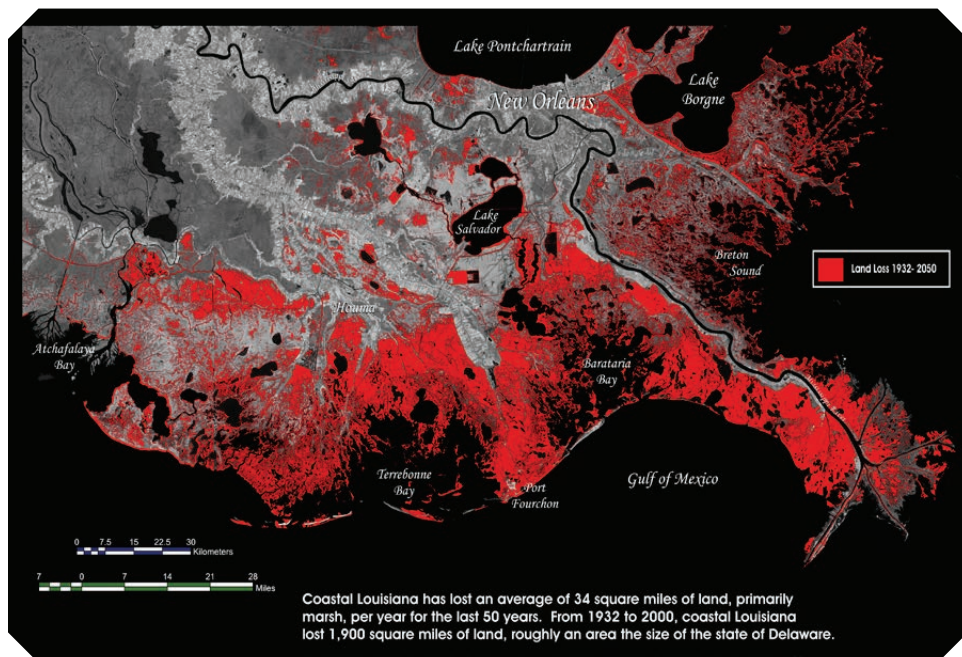
“We need to be a sophisticated customer,” says wetlands advocate Mark Davis, formerly a franchise lawyer. “It's carrot and stick. When they [the engineers] do it right,

we pat them on the head. When they do it wrong, we hit them. If engineers don't have the authority [to replenish the marsh, to protected fish and wildlife], we'll get it. If they don't have the money, we'll find it. They have the bulldozers. They've engineered us into this dangerous situation. We need to help them engineer a way out."⁵



*Thirty-two states and two Canadian provinces drain through the world's fourth largest river basin.
(Army Corps of Engineers)*

Replenish or perish, but how? To unmake a fluid machine more sprawling than Western Europe would be an ambition beyond the store-for-the-future programs that Congress calls conservation. Ecologists want restoration. A 1992 report from the aquatic restoration committee of the National Research Council targeted 10 million acres of impaired but repairable wetlands along 400,000 miles of over-built rivers and streams. Dike-notching, dam-breaching, marsh-building, and the reflooding of riparian farmland were hailed as effective ways to buffer human disturbance—to promote biodiversity, to emulate, said the report, “a natural, self-regulating system that is integrated ecologically with the landscape in which it occurs.”⁶ Never mind that science remained deeply divided over how the dynamic Earth functioned in prehuman nature. Ecologists were convinced that biology and smart engineering could “approximate” liquid nature in its “predisturbance state.”⁷



Historic and projected land loss in southeast Louisiana, 1932-2050. (U.S. Army Corps of Engineers)

Faith in reversible nature floats through the world of the Corps on the hope that human contrivance can sustain enough watery chaos to keep a larger balance in place. For now, however, the research on restoration is soft as the nodding grasslands. What is the measure of human disturbance? Given 12,000 continuous years of Mississippi civilization—a history of hunting with fire, of fishing with weirs, of managing water with drainage canals and levee-like burial mounds—how can an infant science with ambiguous historical data pick out a point in the past and call it pristine? It can't, says historian William Cronon, an authority on the nature of nature. "Wilderness," Cronon writes, "is quite profoundly a human creation—indeed, the creation of very particular human cultures at very particular moments in history."⁸ The pristine is a cultural construct. No science can restore a river to the state of nature because nature—defiant, erratic, a mirror of our own expectations—never freezes into a state.

Nowhere is nature's nature more elusively problematic than in the seven-state alluvial valley of the Lower Mississippi, home to 8.3 million people in 219 counties from southern Illinois to Louisiana, some of the South's most productive soil. That valley, fertile, fragile, is the spout of a mud funnel that drains 1.2 million square miles or 41 percent of the continental United States. Soft and unstable, a rich belt of topsoil as deep as 50 feet, the dark alluvium spread by the river has always defined the valley. "Creamy and sweet-smelling" was how William Alexander Percy described the famous silt in *Lanterns on the Levee* (1941), the memoir of a patrician who pined for the premodern landscape yet well understood that his Mississippi cotton plantation would be ankle-deep in syrupy water if not for flood levees built by the Corps. For Percy the

river that formed the delta was “the shifting, unappeasable god of the country ...gaunt and terrible ...beautiful and dear ...wise ...aloof ...an imbecile blind Titan.”⁹ The godlike prebuilt river was a murderous, magical place.

The managing of that mythic river in so many manifestations is complicated by the fact that ecologists and engineers, without common training or orientation, are professional cultures in contest with conflicting values and goals. Therein lies the technological challenge. Engineers crave a homeostasis of stability and predictable order. The Mississippi is anything but.

In the Wake of Hurricane Betsy

A hurricane is a tropical furnace that draws hot air inward and up. Water vapor condenses, releasing energy: enough power to swirl one billion tons of moisture at one thousand feet per second, enough to run a 300-trillion horsepower motor or light and heat the United States for a year. The fury spins with a cosmic force indifferent to civilization, but the damage done by the storm is a function of human factors. Its power to kill and destroy is a variable closely dependent on human caution or daring, on sound or shoddy construction, on the lure of seaside housing with an open view of the beachfront, and on sprawling urbanization toward evermore marginal land.¹

A hurricane, in short, is a thing of nature, but the disaster it causes is not. "A lot of us argue that increased urbanization and wealth are responsible," says Chris Tucker of Emergency Preparedness Canada. "Look at Los Angeles and Mexico City and Vancouver with their earthquake risk, or Miami and Galveston with their hurricanes. . . . People don't think about where or how they build. They just ignore the natural hazards."² People don't think much about wood housing in a tinderbox grassland or condos anchored to dunes that move with the migrating coast. Even in the metropolis leveed between a coil of the Mississippi and hurricane swells from the Gulf, suburbia fills the floodplain. But the City That Care Forgot has always flirted with devastation. Built in a swamp, rebuilt in 1722 after a 15-hour tempest destroyed houses and sank warships, unscathed by the murderous flood of record in 1927, saved by a massive diversion through the untested Bonnet Carré Spillway in 1937, battered but spared again when hurricanes Flossy (1956), Carla (1961), and Hilda (1964) ravaged and killed nearby, New Orleans has long survived on the hope that evermore massive construction can sustain industrial growth. "We have spent hundreds of millions of dollars to protect ourselves from water," said Louisiana Governor John J. McKeithen in 1965, explaining New Orleans on the eve of its greatest disaster. "We have cut the Mississippi in many places so the water can get faster and quicker to the gulf. We have built levees up and down the Mississippi. . . . We feel like now we are almost completely protected."³

Blessed with oil and gas and fortified at the tip of the world's most sophisticated levee and spillways system, New Orleans seemed "almost completely protected" in the Kennedy-Johnson years of robust urbanization. Back when Americans had towering faith in monumental construction and a killer named Hurricane Betsy, on September 9, 1965, breached the levees of Lake Pontchartrain.



Hurricane Betsy, like Katrina in 2005, breached the levees of the New Orleans inner-city Industrial Canal. Pictured: Betsy tops the canal, September 1965. (Times-Picayune).

Betsy's Toll

Large but shallow, a 635 square-mile blue-green sheet of tide-swept estuary with an average depth no deeper than a conventional basement, Lake Pontchartrain rolls hurricane swells from the Gulf of Mexico into southeast Louisiana about every decade or so. Conquistadors searching for golden cities recorded the violence of tree-ripping winds on September 19, 1559, and since that time 172 hurricanes have raked coastal Louisiana. Thirty-eight have reached New Orleans via Lake Pontchartrain. In 1893, to cite the most deadly example, a day-long barrage of 30-foot swells overtopped coastal levees and flattened a fishing village south of New Orleans, killing 1,500. In 1915 a powerful storm took out a rail bridge and destroyed a lakeside farm colony, killing 250. In 1940 a week of punishing rain marooned thousands of people, but killed only eight. More dangerous storms caused evermore devastation, but science and engineering fought back. Better roads, stronger bridges, home radios, weather radar, rescue helicopters, satellite tracking, each advance in the technology of evacuation was a victory against what had always been the most lethal of nature's elements—the element of surprise.⁴

The downside of those life-saving innovations was a false security that exposed the lakeshore suburbs to waves surging in from the Gulf. Technology was seldom an

unmixed blessing; certainly not in Louisiana where the system built to funnel and deepen the Mississippi also prevented the river's silt from rebuilding a fraying delta, where dredging and oil drilling aggravated the sinking and deterioration that inched New Orleans toward the Gulf. "We have defused problems by diffusing them," wrote Edward Tenner of Princeton in a recent critique of technological over-dependence. "We have exchanged risk to human life for greater exposure to property damage, and then distributed the cost of that damage over space and over time. We have assumed an increasing burden of vigilance along with our protection. Technology is again taking its revenge by converting catastrophic events into chronic conditions—even as natural catastrophes persist."⁵

Vigilance against the routine that obscured the danger of the catastrophic made a record-setting disaster of Hurricane Betsy. Killing surprisingly few but causing remarkable damage, the storm changed little about the way engineers defended New Orleans. It showed, however, that good engineering could have bad consequences, that much of what man had built for the safety of civilization made life in an unstable city less stable than ever before.

Hurricane Betsy began innocently as a "nice round circular storm" off the coast of Venezuela.⁶ On August 27, 1965, the hurricane gained strength and speed as it swept north toward Georgia, looped back for a day over Nassau and then, looping again, pounded the Florida coast. On the morning of September 7, a surge off Biscayne Bay invaded Miami, washing eels through ornate hotels. In a day, Florida lost 90 percent of its avocado crop, half of its lime harvest, and windows and shutters and roofs from 4,300 houses. Seven people died. It was "the meanest wind ever to sweep out of the Caribbean," warned a teletype from the U.S. Coast Guard.⁷ Mean and hard to predict. Curving west on September 8, Betsy entered the gulf with a bead on Galveston Bay.⁸

"Well, those Texans will just handle that storm just like that," the Louisiana governor said. Not yet a year and four months in office, John McKeithen had already weathered powerful Hurricane Hilda, and he doubted that misfortune would strike so quickly again. "It just isn't quite fair," he protested when Betsy seemed to be veering north. It was Thursday, September 9, and McKeithen was with family upstate for a high school football game. At 1:30 p.m. the telephone rang with an update. "This thing," said a staffer in Baton Rouge, "is headed for our state."⁹

At dusk a wave thrown off the Gulf crushed Grand Isle. Breaking pipelines, stripping trees, killing livestock, and floating houses onto the levees or tossing them into the marsh, the great hurricane launched a surge that sheeted across 2.5 million acres. The flooded port of Venice disappeared from satellite photos. Wind gusts up to 170 mph twisted oilrigs and ripped anchor cables. Eleven shipwrecks blocked 30 miles of the swollen Mississippi. There were also 46 "sunken objects" and more than 100 smashed or grounded barges. One barge tanker went down with enough liquid chlorine to kill a city of 40,000 if exposed to the air.

Drifting north with a forward speed of 20 mph, Betsy hit downtown New Orleans soon after nightfall on the 9th of September. Telephone poles snapped. Glass and twisted steel pelted Canal Street. Flooding consumed Claiborne Avenue and

Gentilly. Looters used scuba gear. Just before midnight a green wall of foam off Lake Pontchartrain entered the Industrial Canal and raced toward the Mississippi. Rising to twelve feet as it swept warehouses and rail yards in the lower Ninth Ward of New Orleans, carrying corpses and cargo and cars and finding gaps in the unfinished levees between the port's inner harbor and the Parish of St. Bernard, the flood left pools almost as deep as the lake in suburban Arabi and Chalmette.¹⁰

"I felt something cold, looked down and there I was with water in my lap," said a man who had fallen asleep at the television before the tide off Pontchartrain flooded into Chalmette. "God it was like one giant swimming pool as far as the eye could see. There were people I knew—women, children, screaming, praying ... A woman who lives down the block floated past me, with her two children beside her." A father of eight, strength ebbing, struggled against the Pontchartrain flood with five young children. "I couldn't do it," he grieved to a *Newsweek* reporter. "I had to let two of them go."¹¹

Six thousand houses sustained serious damage below the Port of New Orleans. Twenty thousand people barely escaped with their lives. "People waded shoulder-high in water with babies on their heads," recalled a resident of the hard-hit St. Bernard Parish Carolyn Park subdivision.¹² One man escaped by punching a hole in his ceiling, breaking both hands and his back. Another was saved by a plastic raincoat. "The winds took me," said Eddie Ste. Marie, badly shaken. "I don't know how high I went but I knew I was turning and when I come back down it [the raincoat] formed a parachute ... I saw myself dying. I knew I was going to die."¹³



Priests tour St. Bernard Parish, 1965. (Times-Picayune).

It could have been worse. In 1957 a hurricane weaker than Betsy had killed 556 when victims near St. Charles refused to evacuate. Eight years later an emergency plan was in place. The 4th Army stood ready with seven hundred crates of sanitation equipment, 1,000 drums of water, 8,571 mattress, 21,430 blankets, and 117,000 gas masks. The Red Cross served 1 million cups of coffee and 500 million plates of food.

Rescue boats rushed to the hurricane zone from as far away as Shreveport. With twenty coast guard helicopters and radar support from a U.S. destroyer and air force reconnaissance planes, the relief operation was unprecedented. Governor McKeithen called it “a great, great example of Americanism.” Even so, the catastrophe was unlike anything the delta had seen in peacetime. Injuring 17,600 people and killing 81, Hurricane Betsy, said McKeithen, was “the worst disaster in the state since the Civil War.”¹⁴ The insurance industry reeled in shock. Betsy, said an insurance spokesman, was “the worse natural disaster in [the history of] America—greater even than the 1906 San Francisco earthquake and the Great Chicago Fire combined.”¹⁵ Damage estimates ran as high as \$2.4 billion—more costly than any storm on record, the inflation-adjusted equivalent of \$12 billion today.

The dollar devastation was large but not large enough to shake a city’s sense of itself as a hub of technological progress. In 1966 the recovering city took in \$1 million a day from the petroleum industry, \$50 million a year from business conventions, \$175 million from tourism in the French Quarter, \$190 million in payroll from 27,000 new NASA rocket assembly jobs. No matter that housing foundations were sinking, or the oyster harvest was down, or the marsh below the city was fraying like rotten cloth. New Orleans was making a comeback. “Positive thinking has become infectious in the new boom city of the Southland,” said *U.S. News & World Report*.¹⁶

New Orleans was riding too high for talk of the next disaster. Prosperity was fueling itself.

A Hurricane “Superhighway”

“See that?” Fisherman Frank “Big Kenny” Campo guns his launch toward the ruin of his father’s marina in the shallows east of New Orleans. “Over there, that was Shell Beach. Dry land. That light over there was the shore.”¹⁷

Dark and barrel-chested, an *Isleño* whose peasant foreparents emigrated from the Canary Islands to colonize Louisiana and fight the British for Spain, Kenny, age 50, runs a shanty called Blackie’s Marina from a slip off a freight canal. No fax or Internet listing. No shells. No beach. Wakes slap a small lagoon dank with the rot of swamp grass. Vines and climbing ivy strangle each other for light.

“It’s been, what, thirty-five years since they built the canal? We’ve sunk thirty inches.”

Kenny kills the outboard and glides. A gray man on a timber dock waves a hose at a Styrofoam ice chest. “I’ll tell you what’s wrong with the marsh,” says Blackie Campo.

Father and partner to Kenny and grandfather to a hulk of a youth the family calls Little Kenny, Blackie, age 80, remembers green flats of scrub vegetation. Shell roads

with lumbering oxen. Palm roofs on tar-paper huts. He remembers Bayou Terre aux Bouefs ("land of the oxen") in the Parish of St. Bernard where *Isleños* for 200 years had guarded their isolation. And Blackie darkly recalls the last week of April in 1927 when the U.S. Army Corps of Engineers, with presidential approval and 39 tons of explosives, blasted the record flood into St. Bernard. It was "the public execution of the parish," said a marsh politician, and it haunts the grasslands still.¹⁸ "Make a list of everything the Corps does around here," Blackie advises. "Everything on the list . . . THAT'S what's wrong with the marsh."¹⁹

Once the parish, rich with muskrats, was a fur empire second to none. Blackie remembers when Louisiana exported more fur than all of Canada or Russia. When a silk-lined coat of Genuine Natural Muskrat was, said Sears and Roebuck in 1927, "a remarkable value" at \$199.²⁰ Living wet and eating from tins, a trapper could net a profit, maybe \$4,000 a year. He could also net redfish and trout. "We'd trap in the winter, fish in the summer," says Kenny with a glance Blackie. "Shell Beach had fifty families at one time. We had a train to the French Market [in New Orleans]. The tracks went into the water. Right to the [fishing] schooners. How big were those schooners, daddy? Fifty feet? We'd fish Lake Borgne, mostly. Fish sold by the string, by 'the hand' we used to call it. Croaker, flounder, sheepshead, mackerel . . . Best fish in the world. We never kept anything under two feet."



*An Isleños trapper, right, discusses the flood threat to muskrats near Delacroix Island, Louisiana, about 1940.
(U.S. Farm Security Administration)*

That was before Mister Go. Completed in 1963 at a cost of \$95 million, the Mississippi River Gulf Outlet (called MRGO or “Mister Go”) sliced 40 miles from the treacherous trip through the delta’s meandering passes. Fog and mud bars had plagued navigation through the mouth of the river since 1719 when the French first sounded a channel for warships. In 1838 the U.S. Corps of Engineers scraped at the mud with an endless-chain bucket dredge. The chain broke. Spare parts went down in a shipwreck. After two years of bad luck and mechanical frustration, the captain in charge was convinced that a ship canal was the surest solution, that “any sum, however large, would not be more than commensurate with its [the canal’s] importance.”²¹ A century later the project was “vital,” said Senator Russell B. Long, “to the maintenance of the position we hold in the free world today.”²² MRGO, a boon to the Port of New Orleans, was Louisiana’s response to grain-trade competition from the new St. Lawrence Seaway. It was also a saline cut through the core of Iberian culture in the Parish of St. Bernard.

Already that parish below New Orleans was pooling with open water. Barely two feet above sea level in 1960, the parish, heavy with mud, had been dropping a tenth of an inch each year. Now brine pushed inland by storms ate chunks from the floating reed flats. Shell Beach gave way to Lake Borgne.²³

By 1960 five or six houses on stilts had relocated to a paper-thin puzzle of swamp grass. Storms sped across shallow water faster than ever before. “Betsy moved quick,” said Blackie. “Too quick,” said those who suspected the engineers were somehow involved. It had been 38 years since the Corps had blasted the levee. Had the Corps been at it again? “They give us too much credit,” says Harley Winer, a Corps hydrologist. “Do they think we were out there with dynamite in 100 mph winds? It’s ridiculous.”²⁴

But rumors persist. “Yes sir, they had a plan [to blow the parish levees]. That’s what my cousin told me two days *before* the flood.” When the storm hit two days later, Blackie and Kenny were rushing boats to the cover of swamp. “We were towing skiffs into the forest,” Blackie explains. “I pulled hard against the current. The [MRGO] channel was high [and] the stronger it blew, the higher it got. That’s how the parish flooded.”

Mister Go, said the *Times Picayune*, had become a “hurricane superhighway.”²⁵ That’s the conventional wisdom in New Orleans, the gospel truth in St. Bernard. And yet it’s absurd. “Let’s just call it a popular misconception,” says Robert J. Guizerix, chief of structural engineering at the New Orleans corps. An earnest man in a spotless office, he, too, was a witness to Betsy, and this New Orleans native has spent a career making sure levees don’t fail again. No 500-foot canal could divert a tidal surge, says Guizerix. Nothing as big as Betsy could be captured by anything humanmade. “A hurricane can be 200 miles across. A surge can be 100, maybe 150 miles wide. It’s not going to even notice a tiny cut. It wouldn’t even know it was there.”²⁶

Blackie smiles. Rocking back on a porch tacked to a house that was built from the wreckage of other houses, a house that the engineers “just picked up and moved” to make room for Mister Go, Blackie has already heard too many government experts

who dismiss what a fisherman knows. He remembers the Corps telling Congress that Mister Go could not have flooded the parish because a 1915 hurricane with the same approach had done similar harm. And he remembers the post-Betsy testimony of a Brit named Ian Collins. "He was some kind of scientist from England. A red-haired limey! This guy's going to tell *me* which way the water was flowing? I was there." When the experts denied a link between the channel and hurricane flooding, St. Bernard and six other plaintiffs sued for flood compensation. "The inadequacy of the [levee] system was fully known, fully appreciated, and the consequences were understood," said a parish spokesman.²⁷ After a decade of charges and counter-charges, a 5th district judge tossed the matter from court.

Defeated by government science, the campaign against Mister Go shifted to a war of attrition on murkier legal ground. Congress helped. With President Nixon's signature on January 1, 1970, the National Environmental Policy Act (NEPA) became the first and most far-reaching legislative attempt to "prevent or eliminate damage to the environment and biosphere." A Magna Carta for environmental protection, NEPA made federal builders confront the dark side of engineering—the dislocation, the danger to wild species, the risk of planning gone wrong. The law cut to the bone of Corps economics. By questioning the way the agency had been allowed to define the "benefits" of river improvement, it invited a frank disclosure of what the critics called "social cost."²⁸

NEPA mandated public hearings—a chance for officials in St. Bernard to protest and stall construction at every critical stage. In 1972, the target became the government's plan to cargo traffic to a gleaming new mechanized port. Centroport U.S.A., as the project came to be called, would be the nation's biggest ship lock, a corps-built Port of New Orleans Mister Go extension that would bypass the congested and antiquated urban harbor. Boosters coveted the open space at a small landing called Violet in the Parish of St. Bernard. Pete Savoye of the parish sportsman's league, now a retired carpenter from Chalmette, remembers the local talk: "Hey, we're going to have waterfront property! We're going to have warehouses and industry!"²⁹ Supertanker and container ships would enrich the parish as they crossed back and forth from river to seaway. Rising like an industrial phoenix about 10 miles southeast of Canal Street, the rebuilt landing at Violet would be the Rotterdam of the South.³⁰

So said the Corps, the New Orleans dock board, and Louisiana's powerful Tidewater Development Association. Land developers even mailed out a flyer that promised an annual payroll of \$80 million from 10,000 industrial jobs. Quickly negotiations unraveled, however. Who would make important decisions about issues affecting the parish? What about marsh degradation? What about the hurricane threat? Savoye recalls: "You'd have to have been an idiot to believe some of the things they were saying. You'd have to have been a fool. The politicians said these canals would bring us all kinds of goodies. The parish never got a penny. What we got was erosion and floods."³¹

Corps ecologist Sue Hawes—a tough-minded mother of three who had studied at Brown University and once, in Texas, diffused a cafeteria riot—was prepared for

ideological conflict but unprepared for the rancor of Centroport NEPA hearings. On November 29, 1972, for example, a seething crowd of about 700 ambushed one of the nation's most powerful politicians. Congressman F. Edward Hebert, a long-time Mister Go supporter, said the economy would simply "perish" if the port did not expand. Appealing to patriotism, he asked his constituents to "accept and embrace the common good." Appealing to wallets, he promised to "turn the [the Mister Go spur canal] project over to St. Bernard Parish for development after its completion. This means—hear me well—this means that the New Orleans Dock Board . . . will have nothing to do with any control over any of the land."³² But the parish insurgents had heard it all too often. Chanting and jeering and parading through the room with placards, the protesters drove Hebert off the auditorium stage. Years later Hebert claimed he had never been so rudely treated. Quite a statement. Once the *Isleños* of St. Bernard had defended the bayous with shotguns. Politics had seldom been calm.



The Mississippi River Gulf Outlet (MR-GO) at Saint Bernard Parish, 2006. The Corps, citing flooding and environmental concerns, has since closed the outlet to shipping.

Back on River Road in the old army barracks converted to a government compound, the Corps responded with outrage. "We'll go down there and build the project with tanks and guns if we have to!" said Col. Richard L. Hunt.³³ Politically, however, the bullish era of army-directed construction was already dead. Soon the Tennessee-Tombigbee Waterway was halted by court injunction; so was the Cross

Florida Barge Canal, New Melonis Dam on the Stanislaus, Oakley Dam on the Sangamon, and the Baldwin Channel proposal to float supertankers into California's Central Valley. In Missouri, after a series of NEPA hearings led to embarrassing headlines, the Corps stepped back from its plan for high levees north of St. Louis. In Texas the voters rejected a plan to make Dallas-Ft. Worth a seaport. In Arkansas a federal judge blocked the draining and channelization of Cache River swampland. In Idaho the state wildlife agency borrowed the language of NEPA to protest fish kills below Dworshak, the Corps' tallest dam.³⁴

As engineers grappled with NEPA, Mister Go consumed the marsh. Rapidly eroding, the original 650-foot-wide channel had destroyed 3,000 acres of marsh by the mid-70s. Hurting fish and shellfish, it leaked pollution and salt. The U.S. Wildlife Service feared that a freightway off to Violet would destroy another 5,000 acres and "severely impair" the parish's effort to slow its slide to the Gulf.⁴⁴ In April 1976, the Chief of Engineers in Washington signed off on the Violet project. The governor of Georgia weighed in on the side of the parish. If elected to the Presidency, said Jimmy Carter, he would cleave the pork alliance between the Corps and the Port of New Orleans. No extension to Mister Go would bisect the pasture at Violet. On April 18, 1977, a press release from the Carter White House killed the Centroport concept, calling blandly for "further study."³⁶

It had been twenty-one years since Congress had first approved a new ship lock for New Orleans. Another twenty would pass before a modern lock was again under NEPA review.

A Concrete Solution

"Russ, you know I've a couple of wars on hand," President Lyndon Baines Johnson told the son and political heir of Governor Huey Long.³⁷

Louisiana Senator Russell Bileau Long had been patched through to the White House at 1:30 p.m. on Friday, September 10. A teenager when his larger-than-life father had died from a gut shot in the Baton Rouge statehouse, he was now, at age 43 in 1965, the Senate's majority whip. "Mr. President," said Long from his Senate office, "you know, next to the Great Lakes, Lake Pontchartrain is the biggest lake in America. You know how it stands now? Dry. Just like that, water in a wash basin. The forces of nature took it and just poured it on New Orleans." He paused, milking the moment. "When neighbors are sick and you visit them, they appreciate it."

"I'll certainly send my best man," the President offered.

"We don't want your best man, we want the head man," Long insisted. "Mr. President, we want you."

Six hours later the President was stepping from Air Force One onto the tarmac at New Orleans' Moisant Field. "I am here," the President said, "because I want to see with my own eyes what the unhappy alliance of wind and water have done to this land and its people."³⁸ Wind and water and *man*, the President might have added, because the storm had landed hard where an influx of Texas investors, Lady

Bird Johnson among them, planned to levee off 32,000 acres for 250,000 people in a new suburb and industrial park. New Orleans East, as it was called, would need Corps flood protection; so would the north shore suburbs, Jefferson Parish, the Port of New Orleans, the Port of Venice, Morgan City, and a dozen or more other storm-battered sites. On October 27, 1965, Congress approved \$250 million for Louisiana projects, including a \$56 million down payment on levees and storm barriers for Lake Pontchartrain.³⁹

Expecting a Betsy, the Corps had already published a study with a Pontchartrain hurricane plan: levees, drains, a ship lock, steel and concrete floodwalls, and two gated control structures. The centerpiece would be a fortresslike barrier in the Rigolets pass where waves entered the lake. A Dutch innovation adapted by the British after a North Sea storm killed 300 near London in 1953, storm barriers with mechanical gates could instantly close off a port. The Louisiana version was to be hinged like a seawall with sixteen rotating doors. The barrier would stay open for the ebb and flow of the gulf in normal weather. It would shut during dangerous storms. Fish biologists worried that a dead zone behind the gates might disrupt lake circulation, but in 1974 the Corps environmental impact statement (EIS) minimized the threat to marine life. Environmentalists scoffed.⁴⁰

Corps watchers soon understood more was at stake than marine life. Luke Fontana of New Orleans, an attorney who had crabbed and duck-hunted the black lagoons now slated for subdivisions, led a crusade linking hurricane engineering to tax-supported "land enhancement" schemes. Lady Bird's New Orleans East, for example, would have its own triangle of levees. New levees would also reclaim some 5,000 acres for suburbs in the crab-rich La Branche wetlands, in the cane and tupelo tidewater of Jefferson Parish, and in the north-shore Eden Isle subdivision where developers had land-filled the bayous only to dredge out recreational canals. Critics feared a "piracy" that would "lead to the collapse of the Pontchartrain basin as a viable system."⁴¹ It was "pure pork-barrel," said Fontana.⁴² Builders would reap "windfall profits" and, worse, they were trashing the public domain.⁴³

With backing from north shore shrimpers and crabbers and heavyweight Jim Tripp, chief counsel for the Environmental Defense Fund in New York, Fontana filed for a NEPA injunction in the U.S. 5th District court. What followed was high theatrics: fraud accusations, an attack on the drinking habits of an expert witness, documents photographed with a hidden camera, a red-faced Fontana swearing and slamming the door as he stomped from the judge's chamber, rumors repackaged as news in a *Times-Picayune* exposé. The Corps appeared incompetent when a government hydrologist disputed another's statistics. The Corps appeared corrupt when the plaintiffs produced an early draft of the 1974 EIS. A Corps ecologist had wishfully concluded that storm barriers "should not" interfere with the food chain. But the chief of the engineering division was not taking any chances: "should not" became a definite "will not" in the final report.⁴⁴ That settled it. On December 30, 1977, Judge Charles Schwartz, Jr., denounced the "legally inadequate" science and suspended the twelve-year-old barrier plan.⁴⁵

Chastised and sent back to the lake with a team of Louisiana State University researchers, the Corps, by 1984, had eliminated hurricane barriers from the project design. It no longer mattered. In seventeen years the estimated expense of the project had bloated from \$85 million to \$924 million. The General Accounting Office doubted the barriers could be built even for that. Massive structures of concrete were no longer cost-effective. Dirt was less expensive. The Corps compensated with a great wall of earthen embankments as tall as seventeen feet.⁴⁶

Time plays with the memory of combatants who cling to parts of the puzzle, recalling disparate things. Lake defender Luke Fontana remembers the Corps' attempt to cloud the case in a blizzard of information. Ecologist Sue Hawes remembers "bad science."⁴⁷ Joseph Towers, a Corps attorney, remembers "an embarrassing situation."⁴⁸ Engineer Robert Guizerix remembers mostly the sound of wind sucking water as Betsy "lifted Pontchartrain [over New Orleans] and dropped the lake like a bomb." There are few historical files in the engineer's office. He can't even recall the disputes over levees for land enhancement. "Their scientists said one thing. Ours said another."⁴⁹ That's what Guizerix remembers. All he can say for sure is that barriers guarding the lake are the better engineering solution. Tall levees are more expensive. More expensive and not as safe.

"The next Betsy—that's all it will take," says Guizerix. "When the next big hurricane comes, and it will, people will be wanting the barriers." Meanwhile, he won't be tossing out any plans.

Unnatural Disasters

Memory fades in the wreckage of recent disasters. Four years after Betsy did or did not ride Mister Go, 200 mph Camille, the strongest hurricane on record, sent a 24-foot wave through a Mississippi apartment house where 25 party-goers decided to wait out the storm. The building imploded on impact. One person and the concrete foundation survived.⁵⁰

"Today humans are playing too large a role in natural disasters to call them natural," said a 1984 report from the Swedish Red Cross. "People are changing their environment to make it more *prone* to some disasters, and are behaving so as to make themselves more *vulnerable* to those hazards."⁵¹ As the earth experiences its most dramatic climatic shift since the time of Julius Caesar, the forecast is more of the same: global warming and rising oceans will make major storms more frequent, their impact more intense.⁵²

The toe of Louisiana will vanish according to that dismal forecast, and the battle to hold the alluvial delta now consumes more tax and engineering resources than it originally took to reclaim it. Therein lies the tragedy of safety innovations that promote unsafe behavior, of unknowable hazards and unintended effects. In the wake of Betsy we see that levees block water and silt needed to replenish lowlands, that dredging loosens the land by killing freshwater plants. We understand that the cost of maintaining a Mister Go (\$12 million a year; another \$3 million or more per mile for

marsh restoration) can be much greater than savings from faster shipping. We know that a moving shore is not much of a problem until Man tries to stop it, that concrete solutions to coastal erosion can steepen a beach by deflecting its sand supply. We realize, or we should, that there is no turning back from all that we've made of the marsh without risking economic disaster. Paradoxically, tragically, we also know that to build as before would be to risk a catastrophe worse.⁵³

"It's ironic," says Robert Brown of New Orleans, formerly a Corps publicist, now a homeowner with a cracking driveway. "The system which brings prosperity and security to humans is literally costing them the earth beneath their feet."⁵⁴ Too young to remember Hurricane Betsy, he's learned its lesson nevertheless.

Lessons of the Levees

Philip Brown sits on a box near the edge of a cornfield where his grandfather packed dirt on the levee and the torrent of '27 tore out the family farm. "The end will come with a flood," says Brown, quoting from Nostradamus. "I hope that Nostradamus fellow don't know what he's talking about. I've got six boats under the house just in case."¹

Brown grows cotton, rice, soybeans, and corn in black soil between Lake Providence and the Mississippi, a lush 10,000 acres in the northeast corner of Louisiana just below the Arkansas line. A levee crusader, a true believer in the progress of a Protestant people predestined to reclaim the land, Brown can't figure why the Corps, as he sees it, has "caved in and bent over backwards" when the risk of a flood disaster seems greater than ever before. We drive to a "slide" in the levee where the embankment is badly eroded. A backhoe sits idle next to a tractor and other equipment. It's 2 p.m. on a Friday and there's not a worker in sight.

"They say it's the budget. They always say it's the budget."

Brown knows different. Engineer friends have whispered frustration about the threat of a wildlife lawsuit over construction in the forested floodplain. To repair and upgrade the levees, builders need a mountain of earth. Farmers want it scooped from the forest. The Sierra Club Legal Defense Fund, based in San Francisco and New Orleans, wants to spare the bottomland forest and trench the dirt from the fields. Lawyers negotiate. Biologists hold out for studies of migrating bears and fruit bats while the deliberate Mississippi—rising to 49 feet, now just nine feet below the 1927 flood of record—spreads west and pools over the woodland. A ghost thicket of willows stands on its grey reflection. Hardly a forest. A lumber company has anticipated the levee construction and felled the most valuable trees.

A skiff cuts a wake through the woodland. Silent water. Cotton sky. It's May in Louisiana, the river's most menacing month. Dangerous because it drains some of the flattest land in the nation, the Mississippi can blow through an earthen levee at three million cubic feet per second, about 20 times its normal low-water flow. Brown prepares for the worst. He writes the governor. He flushes out the armadillos that burrow deep into levees. He shoots unspeakable thoughts at his river neighbor, willing him back.

"Levees don't hurt the forest," says Brown, blood rising. "Those Sierra Club environmental people don't know what they're talking about. They're doctors and lawyers from Jackson or someplace. Those environmental people got the Corps giving in and backing up. Engineers should know better. I thought they had more sense than that."²



*A tenant farmstead under the mainstem levees, Lake Providence, Louisiana, 1940.
(Farm Security Administration, Library of Congress)*

Deltas Move

Bent bureaucracy also concerns a man who looks down on the Corps from the relative safety of Lafayette, Louisiana, where the mud fan of the Mississippi meets a ridge guarded by oaks.

Harold Schoeffler, cofounder of the Sierra Club's Delta chapter, is robust and powerfully built. A scout leader who divides his time between selling Cadillacs and preaching the value of wetlands, he agrees that engineering in the era of Clinton has caved to a powerful force. "Hell yes," Schoeffler insists. "[The Corps] has caved into navigation, the [sugar]cane growers, the port authorities, the dredging industry."³ Half-Cajun, half-German, a devout Catholic, a former air force supply sergeant with an engineering degree, Schoeffler claims to know more than enough about what builders have done to the floodplain. Enough to bedevil the Corps. Enough to respect the power of the twisting river and scoff at human constraints.

"The Sierra Club wants to work WITH nature," says Schoeffler, putting it simply. "Engineers want to knock it down."

The tragedy of Man's lost communion with Nature plays well in the Cajun country. Schoeffler's adaptation begins with the Yankee invaders who logged the magnificent cypress. "The greed of those bastards. . . . They put themselves out of business." Logging corporations cleared about 14 million acres of lower Mississippi hardwoods, Schoeffler continues. Little effort was made to replant or even spare a few virgin trees. And when the era of lumber gave way to sugar cane, rice, and oil and gas

exploration, the swamp builders gouged canals to barge in heavy equipment. Even shallow dredging did considerable damage. Schoeffler explains: "Dredging changed natural hydraulics, accelerated siltation, and created oxygen-deprived dead zones where no aquatic life is possible. The worst thing is that no one is calculating the cumulative impact of what we're doing: a rice field here, an oil canal there, a crawfish pond in the swamp, a road blocking the flow on a thousand acres."⁴

June in Lafayette Parish. Nostalgia hangs in the humid air where the bayou people spin stories about swamplands desecrated, about fishermen dispossessed. Schoeffler mourns for the lost republic. Calling engineers "carpetbaggers," he denounces levee-building as a modern enclosure movement to privatize flood-swept land. Today that preoccupation is peaked by a telephone message from Memphis. Sierra Clubbers have sighted the rare history professor with laptop, a threatened species in parts of the South. A call from Lafayette invites me into the bayou, and soon we are scouting by silver canoe in an emerald jungle of songbirds, Louisiana's Atchafalaya.

Wild abundance amid vaulting construction makes this gem of a tourist attraction the nation's most ironic swamp. For centuries the Atchafalaya (pronounced *Uh-chafuh-lie'-yuh*, a Choctaw word meaning "long river") had been a sluggish distributary of the Mississippi, log-jammed and snake-infested. That was before Henry Miller Shreve. Pilot, gambler, inventor, gun-runner for Andy Jackson, the intuitive Shreve adapted the stern-wheel steamboat to shallow-draft navigation by elevating the boiler and flattening the hull. He also taught Louisiana to cut through oxbow channels. In 1831, at Turnbull Bend about fifty miles above Baton Rouge where the sharp corner of Mississippi elbowed Louisiana, Shreve severed a thin neck of land. Engineers then cleared stumps and vines from Louisiana's linguine of channels, and with every navigation improvement the current ran faster and deeper until the Atchafalaya's moss-bearded cyprus floodway was the third or forth largest river in the United States. In 1952 Louisiana Geologist Harold N. Fisk confirmed what the Corps had long suspected: Old Man was straining to jump. The Atchafalaya would "capture" the Mississippi. Texaco, Shell, Mobile, Union Carbide, B.F. Goodrich, du Pont, Uniroyal, Dow, Georgia-Pacific and other industrial giants would be cut from their toxic freightway. Flood Armageddon would sweep to the Gulf through the floodwalls at Morgan City. Big Muddy at New Orleans would be rivulets braided with marsh.

⁵"Deltas move," Schoeffler shrugs. Sensitive to the plight of sinking cities and some 110 petrochemical plants on the river below Baton Rouge, the swamper believes, nevertheless, that the Big Jump of the Mississippi is only a matter of time.

Engineers disagree. Any tourist can take Louisiana Hwy. 1 north from Baton Rouge to the Old River Control complex that holds the Mississippi, keeping the world's busiest water-freight highway in place. Authorized in 1954, opened in 1962, and rebuilt after a barge nearly knocked out the structure in 1973, Old River Control is a five-project, 300-million gallons-per-second enforcer of the status quo. Dividing the Father of Waters where his current strains to the West, the lock and weir complex ensures an equitable split between swamp river and errant parent: 70 percent of the flow held in the Mississippi, 30 percent allowed to escape into the Atchafalaya.



Cypress rise from the green shallows of Bayou Pigeon in Louisiana's Atchafalaya basin. (JAG355/Flickr)

Engineers take justifiable pride in that elegant arrangement, but the river colossus above Baton Rouge, like most construction in water, has unplanned consequences. More sediment than expected fills the basin like sand in a bathtub, reducing the floodway's flood capacity, clogging drainage. Levees close and reconfigure the trackless pathways that bayou people once used to harvest their bounty of crawfish. "It's not going to do much good to save the basin if we don't have access to it," Schoeffler complains.⁶ He says the feds have reneged on their promise to set aside 50,000 wild acres. Although Uncle Sam has purchased the emergency right to flood the taxpayers' floodway, the basin's most powerful players—loggers, miners, soybean farmers, cattle ranchers—want evermore flood protection. Engineers continue to levee and dredge.

What remains of the marshy swath through the heart of the Cajun country is a 135-mile-long semi-tropical semi-wilderness, a treasure by any measure. Larger than Florida's Everglades, the Atchafalaya has been called the last great river swamp in North America: a rest stop and winter resort for more than 300 bird species, for dowitchers, spoonbills, tanagers, grosbeaks, thrushes, and mallards; a fairyland of ferns and tree orchids, of slow water soft with hyacinth lilies and noisy with amphibious life. Schoeffler takes Boy Scouts into the swamp once or twice every year, but today he is shocked to discover his favorite haunt has been clear-cut. The bald cypress is gone. So are the tupelo, pecan, hackberry, water-oak, and water-privet. Our camp is bare as a fairway. Behind a black line of ragged willows screening the camp from the river, all that remains are the shrubs.

A sign reads, "Attention Campers: Woodcutting Prohibited."

Finding wood in any event, Schoeffler torches a fistful of reeds with a disposable lighter. We boil crawfish while slapping mosquitoes. We sleep on a wet canvas. In the morning we paddle to a landing upriver, feast on chicken and rice, exchange the canoe for a Yamaha jet ski, and bounce through open water in oil-rich Vermilion Bay.

Waves roll gently across this sunken floor of a wandering delta. Abandoned by the Mississippi some 5,000 years before the colonial powers of Europe traded for Louisiana, the bayou-fed lime-bottom bay rises a foot each generation—about four times faster than the rise of the North Atlantic. Shrimp, bass, and sea trout mature in the brackish fringe of the bay-swept oystergrass wetlands. Herons visit from Venezuela. Blue geese commute from as far away as the Yukon and Hudson Bay. Schoeffler comes to duck hunt and fish; also to inspect a black mound of shell and clay near a Corps-approved tanker canal. Deposits scooped from the bay—once called "spoil," now called "dredged material" in tribute to the many uses of muck in marsh and island construction—make a dense and gluey foundation for hurricane buffer projects. In theory these projects deflect "wave energy" pounding the shoreline. Schoeffler has another theory. He says the dredging has opened a trench that corrodes the edge of the marsh with a beige foam of reed-killing brine. "It's a moral issue," Schoeffler shouts, craning his neck to be heard over the roar of the jet ski. "An oyster can't make it to court. A shrimp can't make it to court. We have to do what we can."

Rain suspends the tour. We wait out the storm on a trawler with a shrimper named Steve Oleander. A tall young Cajun in rain boots, he spits overboard as we talk.

"What do you think of the Corps?" asks Schoeffler, turning to his preoccupation. Oleander says he seldom has time for the paper.

Schoeffler persists: "Look what they do. The Corps plays chess a move at a time, but nature is ten moves ahead."

Yes, the shrimper concedes, the take from the bay has been thin since the dredge began working the channel. "I ain't had ten damn boxes [of shrimp] all damn season." He leans forward to spit in the water. "I tell you what, you can't stop a coast from moving. Mother Nature, she can move a ten-thousand pound rock."⁷

NEPA and the Giant

A stump forest. An impaired wetland. A delta deprived of land-building mud. Big Muddy continues to vex the nation's largest and most controversial engineering organization, an enigma with a public persona much like the Mississippi, menacing and majestic, reviled and revered.

Two hundred years of dispute has conditioned the Corps to combat. Born in Thomas Jefferson's ploy to purge the friends of Alexander Hamilton from high rank in the United States Army, the engineers and their academy at West Point matured with a Congress deeply divided over the legality of water construction. State legislators of the 1830s vilified the scientific elite of the army, calling it a "military aristocracy." Mark Twain compared the West Pointers to God. Ever since, the Corps has been lauded and lambasted in epic words that mostly obscure its middle position between federalism

and localism, between the Hamiltonian faith in a government run by the experts and the Jeffersonian passion for community power.⁸

How people perceive the Corps' place in the nation is a good indication of how they regard modernization and the government's role in their lives. Farmer Brown of Lake Providence tells a historical story about his grandfather, an engineer, who surveyed for the Mississippi River Commission back in the days when local districts built and maintained the levees with little help from the feds. Then came the Flood of 1927. Exploding through an Arkansas levee at crevasses below Pine Bluff, the discharge of 30 Niagaras (about 450,000 cfs.) washed out a farming community of about 500 people, carrying off cattle and cotton and the Brown family's country store. In all, the swollen river displaced more than 600,000 people in 162,017 homes. Claiming between 250 and 500 victims on 16.5 million acres, the disaster brought the Corps and Congress into flood protection on a massive scale. The Flood Control Act of 1928 made the battle against high water the responsibility of the nation. Sparing the levee farmers the cost of flood construction and shifting that burden to Uncle Sam, the legislation began the \$9.3 billion Mississippi River and Tributaries (MR&T) Project: dikes, dams, pumping stations, floodwalls, floodways, concrete mats in the river, cut-offs through bends in the channel, and a Great Wall of earthen embankments, more than five times the tonnage of dirt moved for the Panama Canal.⁹

"The government built Cadillac levees," says Brown, his mind drifting back to a time when nearly every Louisianan could see that the river—a menace, a monster—was defiant and ever-ready to break human control.

When Brown was a young man during the early Eisenhower administration, the Corps made a promotional film that captured the zeal of the times. *Shackles for the Giant*, released in 1953, told a heroic tale of builders at war with nature, of channel cutoffs that saved Greenville and Arkansas City, of dredges, draglines, and 'dozers that moved 20 tons in a load. The new river of gravel and concrete was "straighter" and "more efficient." No line in the script mentioned the limits of river construction. No footage hinted that engineering might be imperfect or that the giant might not comply.

As the MR&T found a place next to Bonneville Dam and the Manhattan Project in the pantheon of Corps achievement, the lesson of the levees was clear: "it is the lesson," said a 1967 tribute to army construction, "that man, as a spiritual and intellectual entity in the Creator's image, may order his own destiny."¹⁰ Army engineers, the publication continued, were America's "fighting elite." Yet there was arrogance in the story of man's domination of nature, and thus a villainous Corps emerged from the pen of agency critics. "The Corps of Army Engineers is the most powerful and most persuasive lobby in Washington," wrote New Dealer Harold Ickes after Congress refused to behead the quasi-military organization by removing its West Point command.¹¹ Corps-foe Arthur Morgan of the Tennessee Valley Authority compared his nemesis to a "Mafia" built on "explicit falsehoods, . . . a regime of favored dominance rarely paralleled in our government."¹²

Even during the heyday of river building, the Corps was effectively tarred with

allegations of waste and abuse. Presidents Harding, Hoover, Roosevelt, Truman, and Eisenhower all tried to humble the Corps through bureaucratic reorganization. All failed. When FDR rejected the Corps' claim to the Kings Canyon dam site in the California Sierras, Congress, in 1944, simply appropriated the funds. Soon the 1948 Hoover Commission was calling the Corps a rogue that manipulated the budget process. A 1952 House report provided a vivid example: 157 of 182 Corps projects had been approved without the proper cost-benefit documentation. Some had been underestimated 400 percent. Critics now damned the Corps as a public enemy, a diligent destroyer, a beaver whose instinct told it to dam every trickle of water, a dogcatcher compelled to impound anything running wild. "Getting a man off heroin is easy compared with getting Congress off the kind of pork barrel the Corps administers," said Supreme Court Justice William O. Douglas.¹³ Extravagant, destructive, power-mad, and undemocratic, the Corps, wrote journalist Gene Marine, was "the most nearly untouchable empire in the United States, as powerful in its field as the FBI or the CIA and as difficult to oppose."¹⁴

The myth of the imperial Corps survives on the Mississippi because it stands on a partial truth. There is truth in the boast that the Corps has elevated flood engineering with high standards of professionalism. There is also truth in the allegation that the Corps has enjoyed an uncommonly cordial relationship with Congressional patrons, that it has oversold dubious projects, and that its benefit-cost ratios have exaggerated benefits and minimized costs. Still, the agency's past remains imaginative simplification. Beast, benefactor, sinner, saint: the caricatures make the Corps monolithic and omnipresent. They obscure conflict within a decentralized organization. And they depreciate the cultural context—the politics and economics, the hope and fear and folklore and scientific conjecture—that shapes water planning and shades engineering design.

Technology has always responded to culture; it backflipped after President Richard Nixon—in a press conference dramatically scripted for January 1, 1970, the first day of the new decade—empowered Congress to regulate most kinds of public construction through the far-reaching National Environmental Policy Act (NEPA). It was hardly the first legislative attempt to safeguard water resources. The Refuse Act of 1899, the Oil Pollution Act of 1924, the Beach Nourishment Act of 1956, the Federal Water Project Recreation Act of 1965, and the Wild and Scenic Rivers Act of 1968 had all pledged to conserve and preserve by expanding Corps jurisdiction, but NEPA transformed the way government built. A challenge to engineering tradition, the legislation required builders to ponder the system-wide impact of local construction. NEPA, moreover, brought ecologists into the Corps and complicated project planning with archaeological studies, water quality assessments, habitat inventories, citizen advisors, public hearings, and judicial review.

For Lieutenant General Frederick J. Clarke, Chief of Engineers, the key to NEPA compliance was to invite environmentalists into the planning process. Reorganization followed: a blue-ribbon advisory board, a vastly expanded wetlands permit operation, an ecology office in each of the Corps' 11 regional divisions and 36 local districts. By

1976 only the U.S. Transportation Department was publishing more environmental impact statements. Nationwide, the Corps churned out more than 300 environmental assessments at a cost of about \$25 million a year.¹⁵

But did the Corps take NEPA to heart? How warm was its embrace of environmental regulation, and how was NEPA regarded by technicians at water level who watched the river gauges and waited for the inevitable flood? "The Corps responded differently in different places," Hugh "Tom" Holland explains. A Corps zoologist now retired in Tucson, Holland spent four years in Florida with the Jacksonville district before joining the Mississippi Valley Division in 1972. Jacksonville saw NEPA coming. Battlewise after a series of high-stakes lawsuits—a bitter fight over Everglades channelization, an injunction against the Cross Florida Barge Canal—the district in Holland's time had outflanked the green opposition by blocking a trailer park on landfill in Boca Ciega Bay. But the Lower Mississippi drained another political landscape. "The division was more hard-nosed," Holland remembers. At headquarter building in Vicksburg, an arched and turreted landmark that, appropriately, resembles a reddish castle, Holland recalls confusion: the backlog of reservoir studies, the sampling of mud and netting of fish with inadequate scientific equipment, the rush to measure the impact of projects more than thirty years old. "NEPA set us back," says Holland. "It meant more regulations, more hearings, and more lawsuits. It increased our paperwork 900 percent."¹⁶

Upriver a deputy district engineer has been with the Corps long enough to confirm Holland's assessment. David W. Wolfe commands a fifth floor view of Mud Island from the Memphis federal building. Laconic and dour with a gravel voice as coarse as revetment, Wolfe shrugs off the idea that NEPA forced change. "We're always changing," says Wolfe. The defining moment of environmental transformation—if there ever was such a time—was long before the era of Earth Day. He cites a New Deal fisheries law that was amended to regulate dredging about the time Wolfe joined the Corps as student intern during the Eisenhower years. Change is good, he concedes, but Wolfe objects to the way people scapegoat his organization for doing what Congress intended. The solution? "If you've got project authorization, build quickly. Don't wait for people to change their minds."¹⁷

That's a view from inside the castle. From outside, the era of NEPA looked pivotal indeed. While the U.S. Bureau of Reclamation, U.S. Bureau of Land Management, and others were mostly trying to stonewall environmental directives, the Corps, said political scientist Richard A. Liroff, truly welcomed reform. The conclusion was much the same in studies of NEPA compliance. In *Staking the Terrain* (1985), where professors Jeanne Nienaber Clarke and Daniel McCool graded the Corps on a curve against six other natural resource agencies, the builder earned top marks for shedding some of its past. After NEPA the Corps had become a "bureaucratic superstar, . . . the epitome of a successful, aggressive, developing organization."¹⁸ Likewise a 1979 Brookings Institution report called the agency a "possible exception" to the law of bureaucratic behavior that change must proceed at a glacier-like pace.¹⁹

Not everyone applauded. "If a project becomes too controversial, its backers can

simply out wait the opponents," wrote Elizabeth Drew in *Atlantic Monthly*.²⁰ Critics cited the Gulf Intercoastal Canal, the Yazoo flood gates and pumping stations, the lock building above St. Louis, and the hotly disputed Tenn-Tom waterway—all crippled by NEPA, all revived nevertheless. It wasn't only the pork that unsettled the opposition. It was the axiom that, construction being profit and progress, enough tonnage of concrete was an answer to every concern.

"The engineer has become our king," said wetlands defender George Laycock, a critic of the way builders allegedly think: "Where a river silts up—dredge it. When it runs crooked—straighten it. Where it runs straight—deepen it. Where it runs at all—stop it. And where it doesn't run—build a canal."²¹

Every Puddle and Pond

NEPA was a political earthquake. Panic struck Congress the following year when staffers read *Water Wasteland*, Ralph Nader's call to arms. Chesapeake Bay was dying. Bacteria in the Hudson River was 170 times the swimmable limit. Nine out of ten FDA-tested swordfish had mercury levels unsafe for human consumption. A third of the nation's shell fishing bed had been closed due to pollution. The annual commercial shrimp harvest, 6.3 million pounds in 1936, had nosedived to 10,000 pounds.²²

Wetlands were another concern. America's bogs, marshes, mudflats, and flood-swept woodlands—literally the "wet" lands that filtered pollution and sheltered wildlife—were vanishing at a frightening rate. Twenty-two states had lost more than half of their original wetlands. Ten had lost more than 70 percent. In the Lower Mississippi Valley, where the plow had already displaced about 80 percent of the bottomland hardwoods and the fight to protect what remained was especially fierce, the six river-states below Illinois had lost, since Jefferson's time, a Kentucky-size wedge of the swampy heartland, about 28 million acres.²³ Ecologists blamed canal dredging and oil drilling for saltwater eating away at another 3 million acres of Louisiana's coastal wetlands. Although the Corps, in 1967, had been handed the authority to prevent some harmful kinds of wetlands dredging, that mandate was rarely enforced.²⁴

With the 1972 Federal Water Pollution Control Act—the Clean Water Act, as it came to be called—Congress responded in the same grandiose way it had mostly dealt with any waterborne crisis: it gave the Corps a vast and ill-defined regulatory jurisdiction, a quagmire as it turned out. The act, said Tennessee Republican Howard Baker, was "far and away the most significant and promising piece of environmental legislation ever enacted by Congress."²⁵ And it was, except that the legislation bestowed a power most engineers didn't want. Under section 404 of the statute, the Corps was required to issue or deny a permit for any dumping of "dredged or fill material" into "waters of the United States."²⁶ Dredging, long regulated, was easy to define, but *fill*? How about the dirt moved for a house foundation? How about a road through a bog? Army regulations attempted to limit the program to the corridors of transportation that Congress, in 1899, had called "navigable waters." Environmentalists sued to expand that definition and won. In *Natural Resources Defense*

Council, Inc., v. Callaway (1975), Judge Aubrey E. Robinson, Jr., ruled that the 404 permit power should be broadly applied. Congress, Robinson wrote, had extended Corps jurisdiction to "all coastal wetlands, mudflats, swamps, and similar areas that are contiguous or adjacent to other navigable waters."²⁷ Even the water frozen in tundra. Even ponds.

NRDC v. Callaway—a political earthquake, a Corps public relations disaster—made a sheriff out of a builder, turning the in-between organization against its own engineering tradition and breaching the laissez-faire of private property rights. A press release of May 6, 1975, caught the agency's moment of panic. "Millions of people may be presently violating the law," wrote Locke Morton, the Corps' deputy chief of public affairs. "The rancher who wants to enlarge his stock pond . . . the farmer who wants to deepen an irrigation ditch or plow a field . . . the mountaineer who wants to protect his land against stream erosion" might all, said the Corps, be required to file permits and "criminal offenders" might face a year in prison and up to \$25,000 in fines.²⁸ Boldly worded, the Corps' statement was misleading and ill-advised. EPA director Russell E. Train said the reference to plowing farmers was "seriously inaccurate."²⁹ Ron Outen of the National Resources Defense Council accused the Corps of a "coordinated nationwide campaign to create a political backlash" against the Calloway decision. It was a "blitzkrieg of mistruth, innuendo, and exaggeration" said a National Wildlife Federation attorney who threatened to drag the Corps "kicking and screaming" back into federal court.³⁰ Even Army Secretary Howard Callaway, the man immortalized as the vanquished defendant in the famous wetlands lawsuit, conceded that the Corps' response to the issue was "not too smart."³¹

Still there were those who said the court had overstepped the intent of Congress, that the new regulations were bound to have a chilling effect on the activity regulated, and that the Corps could hardly be blamed for bluntly stating the facts. Congressman John B. Breaux, a Louisiana Democrat, slammed the permit program, calling it "a land use power grab that couldn't be accomplished through legislation."³² Corps authority undermined local self-governance, Breaux insisted. Engineers were now arbiters of land schemes and zoning disputes across 85 percent of the state.

"Congress puts an engineer out there to make controversial decisions," says Col. L. Kent Brown of the New Orleans district, a former commander. "The Clean Water Act was supposed to be about water quality, but we use it to tell people they can't develop their property. Politicians like it that way. They want to campaign against big bad government. They expect the Corps to protect the wetlands but Congress won't pass the laws." Brown, who grew up on farms, compares the complexity of the wetlands issue to kicking over a cow turd. "There's more than one bug in it."³³

As engineers kicked at the bugs of environmental regulation, an odd transformation took place. The Corps, no longer the bane of the green revolution, became its last best hope. "Our job," said General Clarke, "was to do what we always had done: do what the people of the country wanted."³⁴ But which people? People who cared about duckweed or those who wanted the Corps to care more about saving their homes? Engineering—good engineering, at least—required clarity of focus and

purpose, a precise understanding of the problem at hand. Seldom, however, had the Corps' constituency mostly agreed on an agenda for water resources. Seldom had clients and patrons spoken with a common voice.

By 1975 the changes transforming the Corps were remaking the lower delta where water was thickly layered with overlapping jurisdictions. Old friends were beginning to quarrel. "Please recognize that we love you," said Louisiana's Governor Edwin Edwards, addressing the Corps at a wetlands hearing. "We think you're a great agency, but we don't need you." Edwards vowed to resist Uncle Sam's interference. "No great damage is going to come to the country if we handle these [water] problems on a local basis—as we intend to do."³⁵

That was a first. Surely the first time since Union troops withdrew during the Era of Reconstruction that Louisiana had told the Corps it could manage just fine on its own.

Yazoo Blues

"This is bigger than Mississippi," said Mike Moore, the state attorney general and target of political wrath. It was January 14, 1990, and the governor in Jackson had recently vetoed a bill that would have prohibited Moore from suing the Corps. At issue was the spidery Yazoo. Flatter than Kansas, larger than Connecticut, the Yazoo was a Fertile Crescent of cotton and soybeans. Moore and his environmentalist allies said the Corps-built levees that drained these croplands were a threat to ecological health.

"This involves the globe, the planet," warned Moore, explaining his maverick stance to a *Chicago Tribune* reporter. "I'm concerned about where we're going to be 20 years from now. This is for the family. To heck with politics. I'm concerned about water, oxygen. I'm ready to fight the fight."³⁶

Pitting farmer against duck hunter, old-guard flatlander against hill-dwellers and the environmentally-minded in gleaming new office towers, the fight suspended a project on the books since the 1930s. A sprawling network of levees, reservoirs, and enlarged channels, the Yazoo project was, said the Corps, "the most advanced flood-control system in the world today, and probably the most complex."³⁷ Also perhaps one of the most expensive. Congress, by 1990, had spent an estimated \$1.3 billion to drain and untangle the Delta. To connect bayous, expedite drainage, and add 112,000 acres of floodplain to the acreage already cleared, the Corps needed another \$150 to \$200 million over the next 25 years.

"This whole thing is absolute madness," said Jim Carroll, an environmental attorney on a commission that hounded the Corps. "This is the last of the great pork barrel projects. It makes the Tennessee Tombigbee Waterway look like a drop in the bucket."³⁸ The solution? "It's time to deauthorize the Yazoo debacle," wrote Lonnie Williamson in a column for *Outdoor Life*.³⁹

Nobody disputed the need for some kind of levee protection. The Yazoo, allegedly an Indian word for "river of death," rose in the hill country of Tennessee-Mississippi and spread through nine major branches and countless bayous southward toward its mouth at the harbor of Vicksburg. Technically a tributary, the Yazoo was the fabled



Boys paddle a makeshift raft over the riparian "batture lands" of the flooding Mississippi, about 1900.
(Alexander Allison/University of New Orleans)

"delta" of the Mississippi—an alluvial flatland with an average slope north to south of only six inches per mile. Once this cotton kingdom was switch cane shaded by forest. "In the state of nature," a naturalist reported in 1849, "this country was almost wholly covered with trees, many of which are of great magnitude."⁴⁰ Backwoodsmen felled the post oak (*Quercus obtusiloba*) for fences and cabins. Boat builders carved square pegs from the honey locust (*Gleditsia triacanthos*). Wild cherry (*Prunus Virgiana*) and black walnut (*Juglans nigra*) made quality cabinets and chairs. Geese, panthers, wolves, bears, deer, and pigs imported from Europe thrived in the Yazoo woodlands. The first Euro-Americans, however, did not. Cursed by mosquitoes and floods, white settlement was sparse before the State of Mississippi provided for the policing of private levees. In 1838 the state legislature authorized the Board of Police to divide the Yazoo basin into five or more levee districts. Inspectors had the power to fine planters who neglected their levees. Slaves could be commandeered for construction so long as they labored close to home. Serious flooding in 1849 and 1858 seeded local support for a safer, more centralized system. In 1859, a basin-wide levee district elected a president, hired an engineer, and raised nearly \$500,000 with a tax of ten cents an acre. Some 12,000 yeomen and 53,000 slaves had drained more than 500,000 acres by the eve of the Civil War.

During the 1870s, when the Corps first studied the Yazoo, 250 miles of steamboat freightway branched toward cotton plantations with an annual yield of 120,000 to 150,000 bales. Major J.H. Willard marveled at the basin's progress. "Conditions have changed immensely," Willard reported from Vicksburg. "By the cooperation of the [Mississippi] river commission, state levee commissions, and the Yazoo and Mississippi Valley Railway Company, a basin some 200 miles long by about 60 miles broad ... has been secured from overflow."⁴¹ But the flooding continued.

Disastrous floods in 1897, 1903, and 1913 melted inadequate levees and left thousands homeless. Upgraded after 1917 with federal monies channeled through the Mississippi River Commission, the Yazoo flood works held against the torrent of '27. At Mounds Landing above Greenville, however, the raging Arkansas joined the Mississippi where a barrage of uprooted trees battered the trembling earth. Fifteen hundred workers sandbagged through the night of April 20, 1927, in a vain attempt to plug a yawning crevasse. The levee, a worker remembered, "felt like jelly." Another recalled that the land "just started boiling. Someone hollered 'Watch out! It's gonna break!' Everyone was hollering to get off. It was like turning a hydrant on—water was shooting forward."⁴² The western bowl of the Yazoo became a 50 by 100-mile lake 20 feet deep in places. High water washed over rooftops 75 miles away.⁴³



Sharecroppers crowd into canvas-tent refugee camps on the levees of the Yazoo River during the 1927 flood. (Mississippi Department of Archives).

Flooding out an estimated 185,000 people in the Yazoo delta, the Mounds Landing crevasse was the worst levee disaster in American history. Another 100,000 deltonians lost homes five years later when the Yazoo flooded near Greenwood. Not until 1936, however, did Congress fully concede that swamp water floods were “a menace to national welfare.” Flood control with that recognition became “a proper activity of the Federal Government in cooperation with the States.”

Colossal and unprecedented, the Flood Control Act of 1936 pledged an astounding \$320 million for 218 projects and 223 surveys. It remained for Mississippi Congressman Will M. Whittington of rainy Leflore County to make sure his neighbors along the Yazoo received an adequate share. As the powerful chair of the House Flood Control Committee and a legend in cotton country, Whittington, in 1937, maneuvered to exempt his constituents from their hated “abc” requirements. No longer would local taxes be needed to (a) relocate public roads, (b) purchase land and easements, or (c) maintain a levees system built almost entirely with federal funds. Whittington, before he retired to Greenwood in 1950, had framed the basic elements of the modern Yazoo plan. Its centerpiece was four Corps-managed reservoirs: Sardis, Arkabutla, Grenada, and Enid, a combined storage capacity of 3.8 million-acre feet. Congress over the years added more than 500 miles of headwater levees for a total cost of \$429 million (in 1995 dollars). In 1941, Congress authorized a breastwork of backwater levees—a project for the lower delta that would keep the Mississippi from pooling over the Yazoo’s forested sump.⁴⁴

Whether the system was pork or elegant plumbing depended on one’s perspective. Flood protection was a matter of public safety, but most the Yazoo’s croplands (1.2 million acres, according to Corps statistics) had been floodplain forest prior to Whittington’s plan. In 1960 the U.S. Fish and Wildlife Service had stated the obvious: the project was “a single-purpose program for increasing agricultural production.”⁴⁵ Two years later the U.S. Soil Conservation Service echoed the same concern: crops would overtake “areas [that] have the greatest potential for the production of high quality hardwood timber in the United States.”⁴⁶ The market value of timber had been excluded from the benefit-cost equations that justified Yazoo levees. Although the Corps had commonly boasted a six-to-one return on spending for flood construction, that analysis, said critics, obscured hidden expenses: the cost of future levees for marginal lands cleared behind federal projects, the cost of walling off natural spillways that cushioned the impact of floods. More costly still, said ecologists in the 1960s, was inevitable habitat loss. Waterfowl using the Mississippi flyway depended on what remained of floodplain forest. Wood ducks, especially, needed the cover of forest for feeding areas, nesting cavities, and brood-rearing habitat. Other dwellers in the vanishing forest were panthers, alligators, ivory-billed woodpeckers, Barred owls, Carolina chickadees, Louisiana black bears, and deer.⁴⁷

The Yazoo was also a fishery. Sport fish included sunfish, catfish, white crappie, blue gill, and freshwater drum. On the Big Sunflower, a tributary slated for dredging, biologists found mussel beds. Fish and wildlife biologist Paul Hartfield said they were “probably the densest accumulation of [mussel] biomass anywhere in the world. If we



*Alligators lurk huge in the Big Sunflower bayous of the Yazoo drainage. Once an endangered species and hunted to near extinction, alligators thrive in protected wetlands, growing larger than 600 pounds.
(William Browning)*

destroy them," said Hartfield from his office in Vicksburg, "we'll be destroying the last big area of aquatic ecosystem stability in the Mississippi Delta."⁴⁸

As conservationists rallied in defense of wetlands, Mother Nature raised the stakes. Record high water in 1973 backed the Mississippi through Steele Bayou, reversing its flow. Flood works, lumbering, and erosion upstream had compromised the lower Yazoo's storage capacity. Again in 1983, 1989, 1990, and 1991 the high water back-flooded cotton plantations. Democrats who had worked against the levees were denounced and swept from office. In November 1991, the Magnolia State elected its first Republican governor since the GOP had retreated after the Civil War.⁴⁹

Among the cotton towns caught in the squabble was Rolling Fork, Mississippi. Population 2,444, it sat on raised foundations in the flatness regularly flooded before the MR&T. The legendary bluesman Muddy Waters was born on a nearby plantation. So was Lawrence Carter, a farmer with 8,000 acres of corn, rice, cotton, and soybeans. Carter recounts history by flood years: 1937 when the water lapped under the piers of the family farmhouse, 1958 when his parents sold their cattle because the pasture was inundated, 1973 when the water rose slowly to build a makeshift levee, 1989 when Steele Bayou backed over their fields. "We need pumps," says Carter, referring to the massive machines on order for the head of Steele Bayou. And we need to clean out the [Big] Sunflower." Once a steamboat channel, the Big Sunflower had been snagged for drainage in the 1950s. When the dredges returned three decades later, the Mississippi Wildlife Federation and others blocked the project in court.



Melvin Price Locks and Dam at Alton, Illinois (Digital Library, U.S. Army Corps of Engineers).

“Environmentalists stand in the way of progress,” says Carter. “The Corps takes the punishment, but we the [levee board] taxes. These projects are really ours.”⁵⁰

Just who pays and who benefits remained through the 1990s the heart of the Yazoo dispute. The Yazoo pumps and the Big Sunflower dredging, both killed in the 1980s, had been revived by Sens. Thad Cochran (R-MS) and Trent Lott (R-MS) in an 11th hour rider to the 1996 Water Resources Development Act. American Rivers and the Issac Walton League denounced the legislation as a 300 million dollar Mississippi farm subsidy. In April 1999, the Environmental Defense Fund and six other organizations appealed to President Clinton. Why, the EDF wanted to know, should taxes clear cropland for soybeans? “Why drain wetlands to increase production of crops when the federal government is spending \$2 billion a year under a different program to do just the opposite—to get farmers to halt overproduction of crops in the face of falling prices by turning farmland back into wetlands?”⁵¹

The economic absurdity, said critics, could only be explained as a classic example of engineers making work for themselves.

Good Soldiers

Steve Reed of Vicksburg District wants to give me three-cubic feet of environmental impact statements. “We made every attempt to do the least amount of damage,” says Reed, a fisheries biologist who joined the Corps about the time the green resistance

suspended the Yazoo project. "We found ways to cut the project back and save the taxpayers about \$47 million. We strive for balance. We want to save every possible tree."⁵²

To strike that natural balance, the Corps pioneers new ways of managing water. Construction pits are landscaped and connect to streams, attracting egrets and wood ducks. Corps-sponsored reforestation programs connect fragments of woodland for deer and bear migration. Dredging with smaller and more sophisticated equipment leaves curves in backwater shallow. Dredge spoil carefully spread soon sprouts luxuriant grass. And when approaches are insufficient, the Corps, if Congress provides, can purchase the land for compensatory mitigation. Such was the case with the Delta National Forest near Lawrence Carter's plantation and also with the Tensas Refuge near Philip Brown's rustic farm.

Reed takes pride in the changing Corps. "We're good soldiers. We follow the chain of command. We do what we are told."

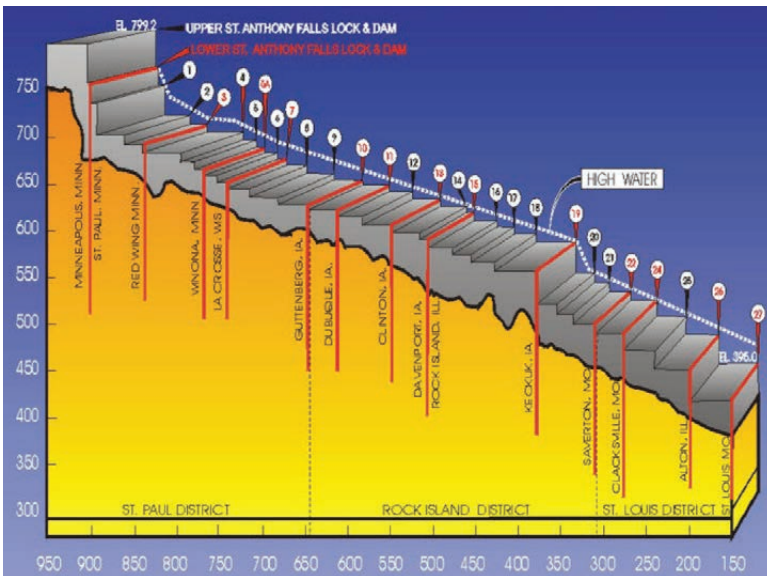
But what if the chain is knotted? What if engineers overcome with disparate directives follow a dangerous path that ecologists are certain is wrong?

Reed shrugs. "Then the environmentalists sue us. We trust the courts to turn things around."

Storm Over Alton

"We see things not as they are, but as we are," wrote the English sea-voyager Henry Major Tomlinson in prose close to the truth about the metaphysics of water in motion.¹ Green crusaders saw red in scarlet flags above hundreds of Corps installations. Wildlife defender Michael Frome, damning dams in a 1968 contribution to *Architectural Forum*, saw a nation "in the grip of an almost psychotic fixation."² Journalist John McPhee saw "something special about dams, something—as conservation problems go—that is disproportionally and metaphysically sinister."³ Bargemen saw mostly profit and progress, especially in the slackwater north of St. Louis where Congress, in 1974, agreed to impound the Father of Waters with 500,000 cubic yards of concrete on 4,600 steel H-beams in a subaquatic cradle of Illinois limestone and sand.

Melvin Price Locks and Dam, as the concrete came to be called, stood like a colossus bolted to bedrock in the crossroads stretch of the river where three major tributaries—the Ohio, Missouri, and Illinois—entered the Mississippi within 250 miles. Proposed in 1968, suspended in 1974, reauthorized in 1978, modified and scaled back after a court battle in the 1980s, the lock and dam regulated the nine-foot towboat channel with nine wedge-shaped 500-ton Tainter gates. Even for the Corps the project was massive. Enough concrete to fill the Astrodome, enough steel for 17,000 luxury automobiles, enough of both for 27 Gateway Arches, enough metal rod and rebar to wrap the planet six times, Melvin Price L&D, said tour guide Craig Smith, was at the time of construction "the largest civil works project in the Continental United States."⁴



Lock-and-dam elevations of the Mississippi's St. Paul to Saint Louis towboat stairway (St. Paul District, U.S. Army Corps of Engineers).

The largest?

"I know it's bigger than Hoover Dam," Smith continued. "It might not look like it, but most of the structure is underwater. You have 1,200 foot guide walls that are forty or fifty feet tall. It's a billion dollar project. Maybe 'largest' refers to the cost."

Is bigger better? Does it mean more efficient or better designed?

Smith paused. "I'm not sure. That's not usually part of the tour."

Bigger was indeed implicitly better for the science-in-action tradition that culminated in a barge lock aptly named for a larger-than-life politician from East St. Louis, Congressman Melvin Price. Bigness, even in colonial times, had bonded government to speculative science. Jefferson had thought his tall Virginia mountains more elevated and sublime than any of Britain's cathedrals, and he pridefully proclaimed that the gigantic jaw bone of a mastodon found in the Ohio Valley was prophecy of a New World civilization that would soon dwarf Europe in grandeur and size. Size became a standard of greatness in the engineer corps that Jefferson founded. Committed to the massive and monumental, the Corps—a planning authority, a pioneer of the benefit-cost mathematics that justified big assignments—successfully argued the link between vigorous government and industrial growth. Corps history reads like an honor roll of engineering sensations. The world's largest independently standing coastal fortification. The world's longest masonry arch. The nation's tallest wave-swept lighthouse. The Washington Monument. The Capitol Dome. The ten-state Pick-Sloan Project along the Missouri River. Bonneville Dam. The Apollo launch pad at Cape Canaveral. The petrochemical freightway along the Arkansas River to Tulsa. The 1,200-foot ship lock at Sault Ste. Marie.

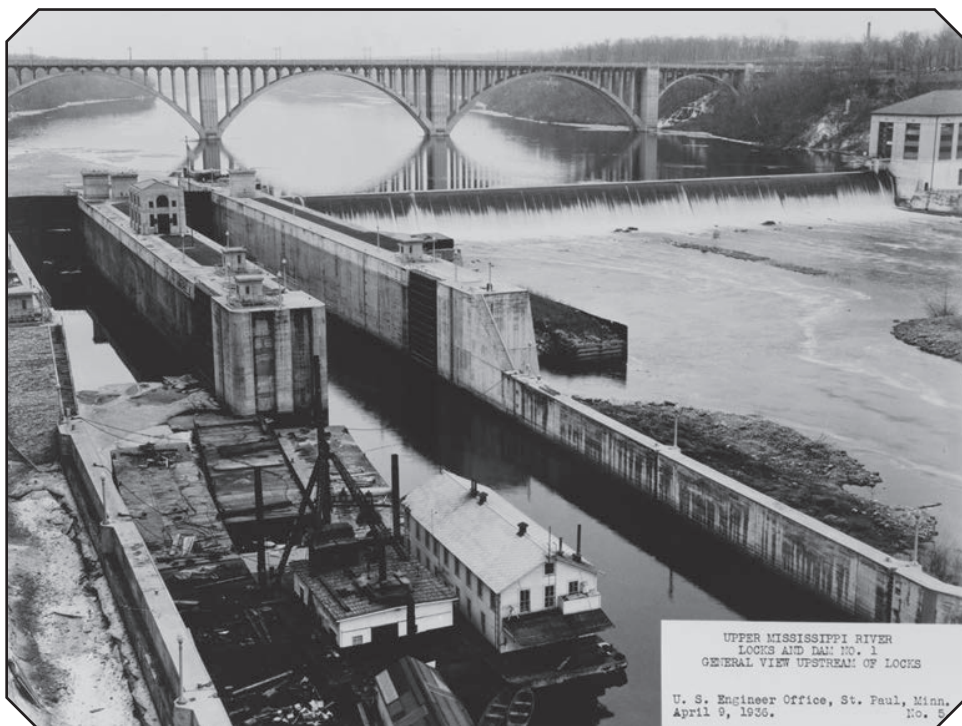
"Large technology," wrote engineer Samuel Florman, a contributor to *Harper's* in 1979, "tends to promote the physical well-being of all citizens;" it was a tool of benevolent government and therefore "a towering force for moral good."⁵ But a counter force, Florman conceded, pulled hard from another direction. Even as the Corps astonished the nation with the evermore bigger and brash, the Carter administration was looking to cut \$2.5 billion from the federal water budget and vowing to restructure the way Congress bankrolled its dams.⁶

The trouble began in west Illinois near the old landing at Alton where Lincoln had debated Douglas, where the port had become a symbol of the anti-slavery movement when five balls from a shotgun cut down the abolitionist editor Elijah P. Lovejoy while a mob was torching his press. Carved into the limestone bluffs above a west-east bend in the Mississippi, the river town was chiefly important to the history of navigation for benchmarks that opened and closed a confident era. It was here during the cruelest years of the Great Depression that the newly expanded St. Louis district first proved its worth to the nation with a triumph of massive construction called Lock and Dam 26; here also that rock solid support for the Corps' slackwater program eroded and nearly gave way.

Aquatic Staircase

Lock and Dam 26—conceived in the 1920s, built with National Recovery Act funding from 1934 to 1938—sat in a bottleneck twenty miles below the mouth of the Illinois River where the tows locked through en route to Chicago or pushed south toward St. Louis or stair-stepped the Corps' aquatic staircase toward Minneapolis-St. Paul. It was an artifact from a golden age of government engineering. Good for shipping. Good for a grain economy dependent on bulky transport. Good for the war effort in the Forties and the booming traffic at St. Louis during the postwar years. The elongated pools of the locked Mississippi, the Corps maintained, were even good for the ecosystem. Lock pools rescued the drought-stricken fish once stranded in backwater shallows. They also arrested bank erosion and created 194,000 acres of new lakeside habitat for wildlife, a gift from the Corps to the states.⁷

For barge industry, most of all, the slackwater was the sweetest of deals: a 29-project toll-free St. Louis to St. Paul freightway, a 9-foot river channel with a 1970 payload of 48 million tons. In 1977 the Congressional Budget Office reported that waterways were the nation's most tax-subsidized mode of transportation. More than airports. More than railroads, pipelines, or interstate trucking. Even after user-fee and cost-sharing reforms of the 1980s, the federal taxpayer still paid out an estimated \$500 million a year for inland navigation, about 92 percent of the tab.⁸



*Barges lock through the nine-foot channel below Ford Parkway Bridge, St. Paul, about 1936
(Historical American Engineering Survey).*

What made the deal so sweet was tax money for rehabilitation and maintenance that included, in 1970, a \$27 million down-payment on the \$400 million the Corps said it needed for lock replacement at Alton. It would be the largest barge project in the history of the Midwest. Old Lock and Dam 26, said the Corps, was a structural blowout waiting to happen. Anchored to river sand, it leaked and groaned and vibrated on a timber foundation. The outer wall in thirty years had shifted ten inches downriver. A hole dug out by the current exposed a waterlogged picket of piles. "It was like walking in a forest," a diver recalled.⁹ And the project was badly situated. Wedged in a dangerous spot where the tows swung across the current to avoid a hump in the Illinois shore, the lock with its 600-foot-long main chamber had room for nine barges, only half the capacity of the shipping canal downstream. Electric winches and helper boats slowly broke down cumbersome tows as they lined up for lockage at Alton. "The present lock has exceeded its design capacity," said John Swift of the *Waterways Journal*, a barge industry publication.¹⁰ Barge congestion was causing 48-hour delays.¹¹

Barge owners said they were losing \$100 an hour, \$160,000 a month, and the railroads were delighted. Rail revenues soared, increasing about 50 percent in the St. Louis region during the 1960s. The Western Railroads Association predicted "catastrophic economic effects" if the Corps were allowed to "artificially stimulate" Mississippi navigation by replacing the locks at Alton.¹² Why was the new project so enormous? Why was it being designed with two giant lock chambers and enough sill capacity for barges with a 12-foot draft? Because the real objective, said critics, was a deeper, wider, 12-foot navigation channel that would quadruple the great river's freight.

Challenging the Corps on the grounds that rail cars were heavily taxed while barges were not, that big locks aggravated the sedimentation that clogged riparian wetlands, that they also endangered \$382 million in rail revenues and 35,000 jobs, the railroad association, on August 6, 1974, filed suit in U.S. District Court. Twenty-one railroads enlisted against the Corps' ambition at Alton. The Sierra Club and the Izaak Walton League set aside a suspicion of railroads and signed on as well. Independently the improbable partners had made little headway in Congress. Together they had passion and clout.

Railroads upset with subsidy? The irony was thick. Barge owners thundered against an estimated \$700 million a year in federal support for railroads, including the subsidy for hauling mail, for eliminating rail crossings, for social security transfers to rail pensions, for Conrail stock buyouts, for bailouts and giveaways dating back to Cornelius Vanderbilt and the land-scheme rail scandals that tarnished President Grant. "Pure greed" was how St. Paul barge industrialist John W. Lambert characterized the railroads' position.¹³ Rail money was tainted money, and counterculture idealists, one attorney conceded, "were skittish about dealing with railroads."¹⁴ But they relented. Hating the Corps more than they distrusted each other, bearded ecologists and rail lawyers in pinstripes shared the same apocalyptic vision of a sterile, stagnant, single-purpose towboat causeway, an Upper Mississippi remade.

The biggest fear in the war against lock replacement was that the Corps wanted more for the river than any river could handle. More tows. More dredging. More

dredge spoil dumped into wetlands. More suspended silt in the brown plumes trailing behind 10,000 horsepower motors. More sedimentation in backwater channels and sloughs. Already the locked Mississippi had lost about a fourth of its marshy backwater, a federal commission reported. Old Man was rapidly aging. Lock pools had become catch-basins for the upland topsoil washed through the veins of commerce into the continent's heart.¹⁵

Perfecting Nature

Once there was hope that big engineering might cleanse an industrial river. In 1943 the top wildlife biologist at FDR's Fish and Wildlife Service published the astonishing claim that the locks and dams had rejuvenated the great Mississippi waterfowl flyway, that the health of the floodplain had "vastly improved."¹⁶ Dams had backed the river up over meadows. Lock pools had spread a leafy-green carpet of pondweed that sheltered the mallards and teals. Slackwater was also good for the mayflies. An excellent fish food, the mayfly nymphs rose like a fog off the impounded river, and they died in blankets so thick that towns cleared bridges with snowplows. Slow-water fish did well in the Corps-built 9-foot channel. Carp thrived. So did blue gill, crappie, sunfish, large-mouth bass, and northern pike.¹⁷

Not everything prospered, of course. Not the slough-feeding pallid sturgeon. Not the fast-water channel-dwellers like sauger and small-mouth bass; but, as General Clarke took pains to explain, "There's no use trying to perfect nature without disturbing it." Clarke chided a soft generation for expecting too much: "There were no trout in the Missouri River that Lewis and Clark explored up to Montana; it was too muddy. There were no game fish in the Colorado when Coronado gave it its name because of the red silt it bore." There would always be winners and losers on a planet ravaged by change. "We demand that [nature] be left untouched," Clarke continued in a letter to *Fortune*. "We also expect it to be made ideal, and justify our demands on the fictitious ground that it once was perfect and has been spoiled."

Clarke's top man in St. Louis agreed that the opposition at Alton had misread the historical trend. "Hogwash," said Col. Guy E. Jester, a future barge lobbyist. "The navigation improvements [have] actually prolonged the life of this river if you look at the history of what has gone on."¹⁸

Ecologists told another historical story, documenting it for the courts. In their history the levees had ended the floods that replenished bottomland lakes so rich with nutritious plankton. Dikes constrained the river and cut off the shallow places. Dams trapped the silt and sand that smothered the spawning beds. Another concern aired in the courts was the danger of channel dredging. In 1973 the state of Wisconsin used a NEPA injunction to suspend a suction-cutter dredge operation that, biologists said, dumped spoil into grassy wetlands. Two years later, in a similar action, Minnesota won a suit that linked dredging to river pollution. Congress then humbled the Corps with a 1977 Clean Water Act amendment that made dredgers get permits from states.¹⁹

"Those silly butterfly chasers," snapped an anonymous Corps official quoted in the

Wall Street Journal. "Those ignorant, misguided, conceited fools, they know not what they say."²⁰ In the public relations campaign that followed, the Corps, said agency broadsides, was "the one Federal agency that has done more for natural resources development than any other," a "dedicated leader" of the conservation movement and a "pioneer" of the principle that "nature is unified and should be managed as a system."²¹ Fish ladders and boat ramps. Nature preserves and scenic drives and 400 water parks along 30,000 miles of public shoreline. All were cited as proof that the capable engineers, as one writer put it, were "taking command of the environment."²² Engineers, said another, "were assisting the conservation movement for many years before the term 'environmentalism' was even coined."²³

Historians greened the Corps. Lawyers distanced the river builders from the barge industry lobby by denying that bigger locks were the agency's ultimate goal. There was no official authorization to deepen the river's nine-foot channel, no sinister plan. But the Corps' North Central Division, reporting in 1972, had openly maintained that "increases in lock size and increases in channel depths from nine to twelve feet on the Upper Mississippi and Illinois Waterway is recognized as a distinct need."²⁴ Most of the locked Ohio was already a 12-foot channel. Support for bigger locks above St. Louis stretched back to a 1945 Congressional resolution and a Corps feasibility study completed in 1949. When Rock Island District Engineer Walter C. Gelini used a 1968 public meeting to detail plans for a deeper channel, a Missouri state game official inquired about the danger to wetlands. "The 12-foot channel is here—today or tomorrow," Gelini replied.²⁵

Back in a Washington courtroom it took Judge Charles Richey exactly a month to rule that fear for the system-wide impact of lock expansion was a reasonable concern. The pretense that plans for bigger locks were unconnected to plans for bigger channels was, Richey admonished, "unworthy of belief."²⁶ On September 6, 1974, the judge suspended the design work at Alton. First the Corps would have to answer to NEPA. If Congress wanted an oversized double lock, the Corps would have to figure the cost—to the railroads, to the taxpayers, to the environment—of bigger locks and dams up and down the system, of an Upper Mississippi with an annual cargo capacity of 200 million tons.

Quickly the Corps went back to work on a supplemental EIS that considered the wider impact of bigger locks but arrived at the same two points: first, the danger to the environment was minimal; second, the old timber and concrete project was a hazard that should be replaced. Critics went apoplectic. *Reader's Digest* called big locks "a multibillion-dollar rip-off."²⁷ A *60 Minutes* report implied that "big business" had hoodwinked "big government" into building a Taj Mahal.²⁸ In the end it was all too much for Army Secretary Howard Callaway. Infamous for his part in the recent Waterloo over the 404 wetlands program, the secretary, on August 4, 1976, recommended a halfway retreat: Congress, for now, would approve just one 1,200-foot lock chamber at Alton. An interagency basin commission would continue to study the need for a second chamber and the Izaak Walton League would continue to fight it in court.²⁹

David Slays Goliath

The big issue left on the table was the question of user fees. Senator Pete V. Domenici of New Mexico still dreamed the impossible dream of a pay-as-you-go charge on water freight or some kind of excise tax. In an uphill battle against powerful forces—against senators Russell B. Long of Louisiana, John C. Stennis of Mississippi, John L. McClellan of Arkansas, Adlai E. Stevenson III and Melvin Price of Illinois—Domenici backed the barge lines into a tax. Environmentalists suggested a levy of 63 cents per gallon of diesel oil burned on the river. Secretary Brock Adams of Carter's transportation department said 40 cents would suffice. Greased by more than a million dollars flowing to Congress from every direction, the House in 1978, voted 276 to 123 for a compromise that had already cleared in the Senate: a modest tax of ten cents per gallon would trickle into a savings account for construction, an inland waterways trust.³⁰



*New Mexico Senator Pete Domenici, left, and Louisiana Senator Russell Long.
(Madeline Marshall /The Learning Tree).*

Ann Cooper of *Congressional Quarterly* saw David slaying Goliath. "Pete Domenici," cheered the reporter, "went head to head with Russell Long—and Domenici won!"³¹ But Long was the silent victor. A legend in Louisiana, a cigar-chewing, word-slurring master of the federal tax code who, as the youngest senator ever elected, had entered politics in the decade after his famously clownish and dictatorial governor-father had been martyred by a single gunshot, Senator Russell Billie Long retained the family gift for seeing where the nation was headed and wading in with the flow. Long guarded a quiet respect for the renegade Domenici. Although the two politicians were a wet-and-dry study in contrast—one a barge Democrat from the soggiest state in the Union, the other a rail Republican from the most arid of states—both Long and Domenici sat on the Senate finance committee, and there after months of arcane debate they bristled at the arrogance of the water-freight lobbyists who, conceding nothing, had stonewalled the tax agreement already approved by the House.

"We're going to pass you a bill," Long assured Domenici.³² And the 95th Congress delivered . . . but not before the arm-twister from Baton Rouge and House Speaker Tip O'Neill knifed into the user-fee concept, removing its fiscal heart. Ten cents was token taxation. There would be no pay-as-you-go provision, no attempt to recover any significant portion of the lock project's actual cost.

The Long-Domenici agreement was tentative yet richly symbolic, a preview of the fiscal retrenchment that softened the Corps to reform. In 1980 President Jimmy Carter asked the House to suspend 125 water projects even as the contractors began driving the H-beams for the technological marvel later named Melvin Price. The following year a drought choked navigation. The Grain and Feed Association of Illinois, complaining of crippling delays where the barges queued up at Alton, blamed the imperfect river for international food inflation. The Sierra Club of Wisconsin called it a "troubled resource."

As a mix of the old and the new filtered from Reagan's White House—tax cuts, cost-sharing, environmental rollbacks—the Corps' constituency made do with less. In 1983 the Lower Mississippi Flood Control Association reluctantly shaved \$100 million off a \$400 million request for levees and a pumping station. In 1984 the Corps spent less on construction than maintenance—a historic first.

A half century had passed since the wedding-cake side wheeler watchmen marked twain north of St. Louis, two centuries since Congress, in 1787, had stipulated that the inland waterways "shall be common highways and forever free . . . without any tax, impost, or duty."³³ The army's most brilliant technicians had in those formative



*A biologist counts mussels at a University of Iowa riverside research station, 2010.
(University of Iowa LACMRERS)*

years matted and snagged about 27,000 miles of navigable watercourses. Elevating government, they had pioneered a place for the schooled expert as a policy insider. Embracing a builder's faith in water as a pathway to progress, they were seldom politically neutral, yet good engineers well understood that logrolling for levees and locks was a ritual reserved for elected officials, a political rite. Dutiful service to a free-spending Congress had built, since 1936, more than 1,500 waterway projects. It had prevented at least \$150 billion in flood damage, and that, according to Corps accounting, was a payback of 7 to 1. The engineers had remade the Mississippi into the spine of a 14,000-mile transport network that moved, annually, more than two billion waterborne tons.³⁴

Waterways as a public investment. Waterways as federal aid to factories and farms. Once Americans had mostly trusted their lock and dam organization to strive for a more perfect union by fixing small imperfections in God's near-perfect Earth. No longer. The politics of big engineering had shifted in the storm over Alton. Suddenly the foundation seemed hollow.

An Environmental Ethic

T. S. Eliot said it best: "The river is a strong brown god . . . Sullen, untamed, . . . useful, untrustworthy, . . . Keeping his seasons in rages, destroyer, reminder of what men chose to forget."³⁵

What men chose to forget in the heat of the battle at Alton was that Corps engineering had always been more than conquest and human contrivance. There had always been romance, even regret, in the scientific mind of the army; in the wanderlust of topographer John C. Frémont who paused atop snow-capped peaks to contemplate noble insects; in the remorse of Yellowstone explorer William F. Reynolds who protested "the entire extinction" of America's buffalo herds; in the Faustian anguish of postwar Chief Engineer Samuel D. Sturgis, Jr., who built the monumental but pined, nevertheless, for the mossy stream in the pungent forest, the lost wood of his youth. "Man cannot dominate," Sturgis insisted in 1953.³⁶ Addressing a Milwaukee convention of fish and game commissioners even as the Corps was elsewhere selling the "unified plan to convert a wild and destructive river into a tame and beneficial one," Sturgis, looking forward, looking backward, straddled the distance between what engineering had done for the nation and what the future repenting republic would make engineering become.³⁷

It was not faith in the gospel of progress that unsettled a builder like Sturgis. It was blind faith.

"All of us here at the Corps in one way or another have taken on an environmental ethic," said Lt. General Henry Hatch, the Corps' 47th commander. Hatch had won his command in the wake of 1986 court-ordered compromise that pledged \$190 million for habitat restoration. The quid-pro-quo was Congressional authorization for a second, albeit smaller, lock chamber at Melvin Price. Hatch seized a magnanimous moment to concede that yesterday's engineers had, perhaps, taken

a too narrow view of the national interests. Greener and wiser, the Corps would now embrace "an ethic of environmental sustainability;" it would "look beyond the law, and well beyond past practices, to see how we might apply our skills to solving the world's environmental problems—and how we might make our work more environmentally sound." Eco-engineering would become a "Pearl Harbor" to rescue the planet. Tree planting, marsh building, wildlife preserves, beach restoration, wastewater treatment, toxic waste clean-up, dredge spoil research, and a vastly expanded wetlands permitting program would soon make the Corps, said Hatch, the "world leader" of green innovation. Nation builders would "take command of the environment," returning manscape to landscape and restoring a sustainable Earth.³⁸



*Rock dikes with cuts or "notches" diversify slack water, creating shallows and contours.
(St. Louis District, U.S. Army Corps of Engineers).*

Dislodged from its bend in the river, searching for mission and purpose, the Corps, said *The Washington Post*, had pulled off "the ultimate bureaucratic miracle."³⁹ Even former adversaries like Norah Deakin Davis, an author who had hammered the Corps with nostalgia for rushing rivers, came away cautiously optimistic after meetings with Hatch. "The Army Engineers want to shed their old image and become the good guys," wrote Davis in *American Forests*.⁴⁰ The nation builders, it seemed, had learned to think cosmically about the impact of single projects on thousand-mile river systems. Less arrogant, they had "partnered" with fish and game agencies and environmental clients. More imaginative, they had cut V-notches into rock dikes to rescue the murky pools from backwater sedimentation. They had built perches for eagles, islands for shorebirds. They had scored miles of skinny grooves into concrete river-bank

revetment so that insects and protozoa could better sustain the aquatic food chain. They had rolled out a soft, green carpet of marsh grass by fluctuating the water levels behind Corps locks and dams. "The whistle has blown and the army has wheeled," wrote Hope Babcock, an Audubon Society critic.⁴¹ In 1992 the Corps spent \$260 million on so-called environmental projects, about 8 percent of its \$3.3 billion budget for civil works.⁴²

Yet the weight of another tradition still drove the construction giant. "Engineers can be imaginative, risk-taking people, but most of the time," wrote science journalist Robert Pool, "they color inside the lines."⁴³ Engineers clung to tradition because risk invited disaster, because their positivism grated against the gloom of biological science, because material progress through water construction was still their fundamental reason for being. Even disarmingly earnest General Hatch was realist enough to admit "that [environmental compliance] doesn't mean I'm going to destroy the economics of a project that is needed for economic reasons by overburdening it with the environmental aspects."⁴⁴ Hatch still had to believe that engineering would fix engineering. He still thought builders should build. More coastal marsh? The Corps would use dredge material to shore the sinking lowlands. More wet prairie? The Corps would build a prairie educational center in the very shadow of its biggest lock.

In these ways the Mississippi Corps remained an agency in-between: between the promise and peril of technological modernization, between Hamiltonian commitment



Bass fishing thrives below Melvin Price on mudflats replanted as marsh. (Missouriflies.com)

to industrial progress and Jeffersonian longing for the greener, older, more erratic and chaste Mississippi lost to the industrial age. "We tried to stay in the middle," said Owen Dutt of the St. Louis District, a planning chief who spent more than a decade in the thick of the fight over Melvin Price. "It was the wild-eyed environmentalists versus the American Way—that's how the shippers saw it." Did the Corps manage to remain impartial? "We thought so but the courts said otherwise. In retrospect, I guess they were right."⁴⁵

Dutt makes the essential point about the in-between organization. Bureaucracy seeking the middle ground might still take a position. And that is why the ideology of the Corps still rises off the river like mayflies: in Vicksburg where an engineer refused to concede that levees and dams had subsidized agriculture; in Alton where I was informed that the Corps had "built" Yellowstone; in St. Louis where an expert said the Corps had rescued a forested river degraded by wood-burning steamboats; in Memphis where a public relations man said the agency had been an environmental crusader since the time of Lewis and Clark.

It takes distance to see ideology. Historical distance. Only in retrospect is it possible to understand how inextricably environmentalism has become intertwined with the strands of two different dogmas. One is the hopeful view that engineering might yet revive a vanishing landscape. The other holds that humanity can never replicate the rhythms of nature and our safest course is never to try.

Notes

Prologue: Losing Louisiana

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Chapter 1: In the Wake of Hurricane Betsy

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Todd's public history work has been nationally featured in *The New York Times*, *Money Magazine*, and National Public Radio's *Morning Edition*. In 2002 he was the Carnegie Foundation for the Advancement of Education's "Idaho Professor of the Year." Named "City Historian" by the Boise Mayor and City Council, he founded the Boise City Office of the Historian and the First Thursday Fettuccine Forum. In 2007, Shallat led a citywide investigation concerning the plight of Boiseans evicted from mobile home parks. The report won Idaho's urban planning "grow smart" award. Meanwhile his production work on the journal *Idaho Yesterdays* received the Idaho Heritage Trust Media Award. In 2007 and 2008, Shallat won his college's "researcher of the year" award and the Boise State University Foundation public service award. In 2009 he won the city's arts and history "excellence" award. From 2008 to 2011, he was the editor of the state's acclaimed research magazine, *Idaho Landscapes: History, Science, and Art*.

He is the editor chiefly responsible for non-fiction book publishing via the university's publications office (see sspa.boisestate.edu/publications).

Todd is the sole author of four books and the lead co-author of another seven about cities, technology, and the environment. He is the winner of the Henry Adams Book Prize from the Society for Federal History, the Abel Wolman Book Award from the American Public Works Association, the Idaho Book Award from the Idaho Library Association, the Independent Publishing Association's "honorable mention" for history publishing, and the Gold Medal for feature writing from the Council for the Advancement and Support of Education (CASE). His book publications include *Structures in the Stream: Water, Science, and the U. S. Army Corps of Engineers* (1994), *Snake: The Plain and Its People* (1994), *Secrets of the Magic Valley and Hagerman's Remarkable Horse* (2002); *Water and the Rise of Public Ownership on the Fresno Plain* (1978), and *Ethnic Landmarks: Ten Historic Places That Define the City of Trees* (2007). He is the senior coauthor of the Idaho State Department of Education top-ranked history textbook, *The Idaho Adventure* (2010). A 1988 contract history of the Birds of Prey National Area won the Secretary of the Interior's Outstanding Service Award. From 1997 to 2000, Todd studied flooding and the environment as a visiting scholar with the U.S. Mississippi River Commission.



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